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ELECTRIC RAILWAY JOURNAL

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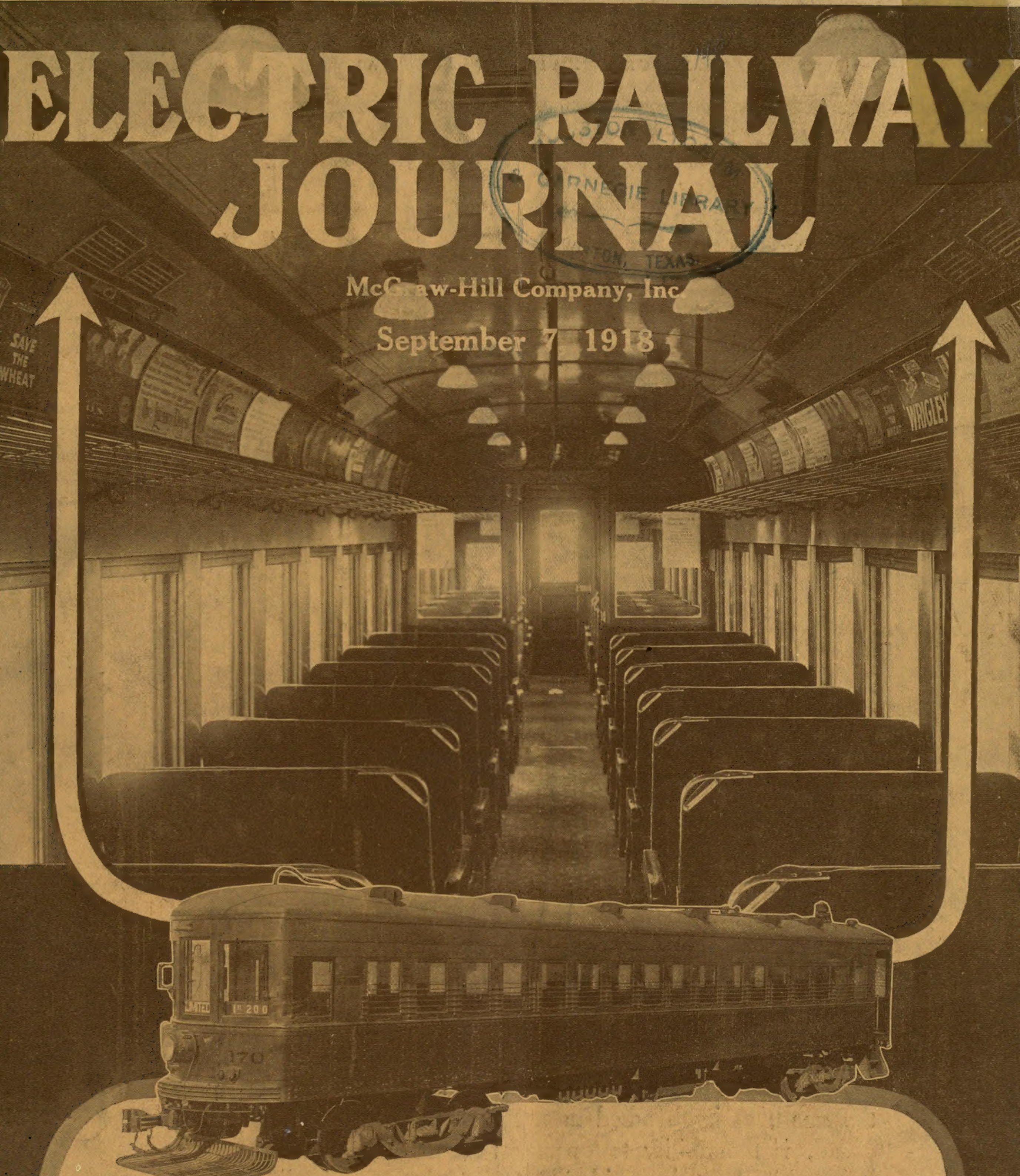
McGraw-Hill Company, Inc.

September 7, 1918



The arched roof cars of the Lake Shore Electric Railway are equipped with

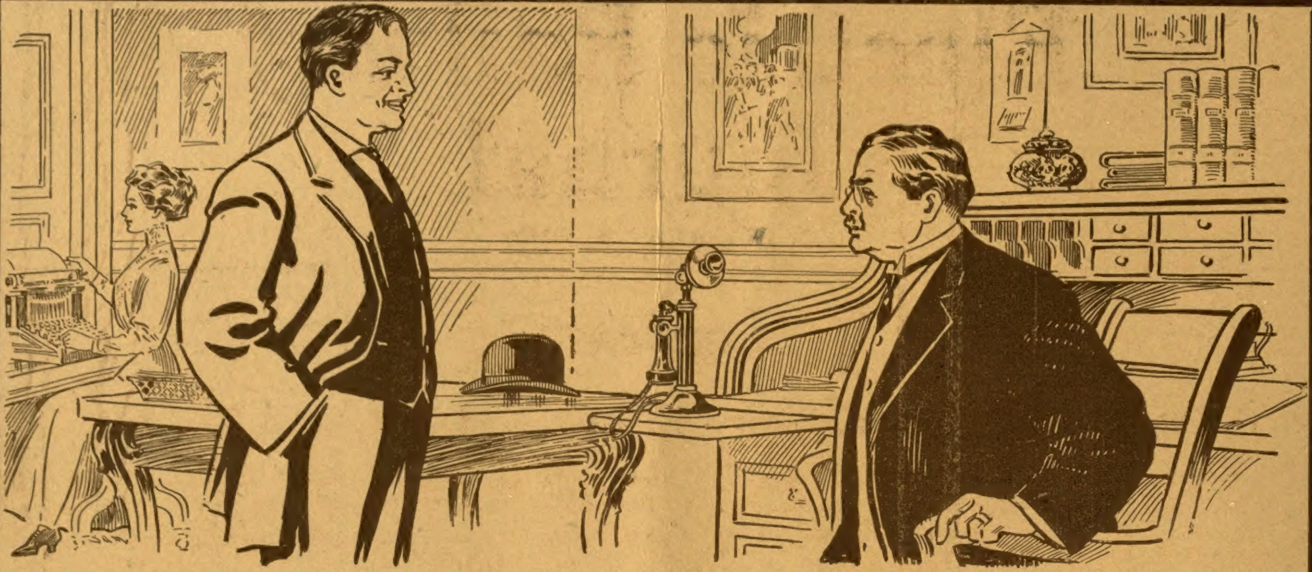
Automatic Ventilators

insuring a plentiful supply of fresh air and the total absence of impure air

THE "Automatic" Intake-and-Exhaust system of Car Ventilation is standard on all passenger cars where the "best" is desired, from Maine to California and from Northern Ontario to Florida. It costs little to install and there the expense ends—no operating or repair charges.

AUTOMATIC VENTILATOR COMPANY, 2 Rector Street, New York, N. Y.

Pacific Coast Representatives: ECCLES & SMITH CO. of Los Angeles, San Francisco and Portland



Train Operation

"JOE," said the General Manager to the Superintendent, "I was very much gratified while East last week, to learn that most of the big Eastern roads had bought Multiple-Unit Control for their new cars. You know we were criticised a few years ago, when we decided on Westinghouse H. L. Control for our city cars."

"Well," replied Joe, "It's only a question of time until they will all come to it. The place for heavy-current carrying parts is under the car. All that should be on the platform is the small, easily handled master controller and most important of all, is the ability to operate two, or more, cars in trains. It saves labor and provides better rush-hour service."

Westinghouse Electric & Manufacturing Co.

East Pittsburgh Pennsylvania

Vol. 52, No. 10 New York, September 7, 1918 ***Pages* 401 *to* 444**

Electric Railway Journal

H. W. BLAKE, *Editor*

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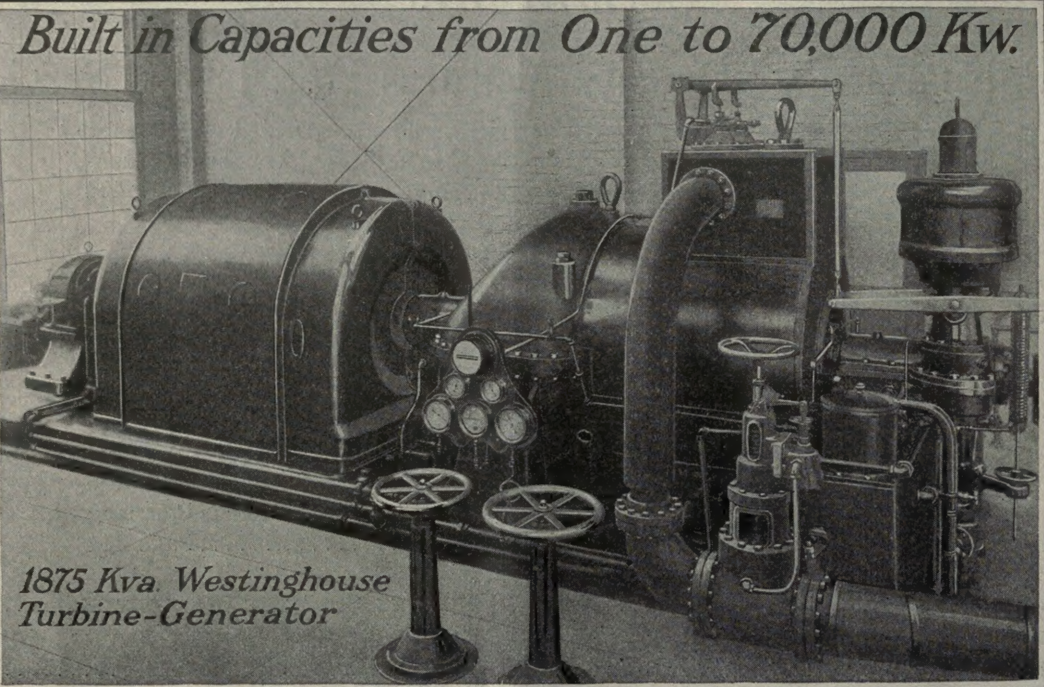
Westinghouse

Turbine Generators



Built in Capacities from One to 70,000 Kw.

1875 Kva Westinghouse Turbine-Generator

Westinghouse was first to develop and to introduce into this country, the **Alternating** Current System of Power Generation—which has made it possible to transmit electric current hundreds of miles economically.

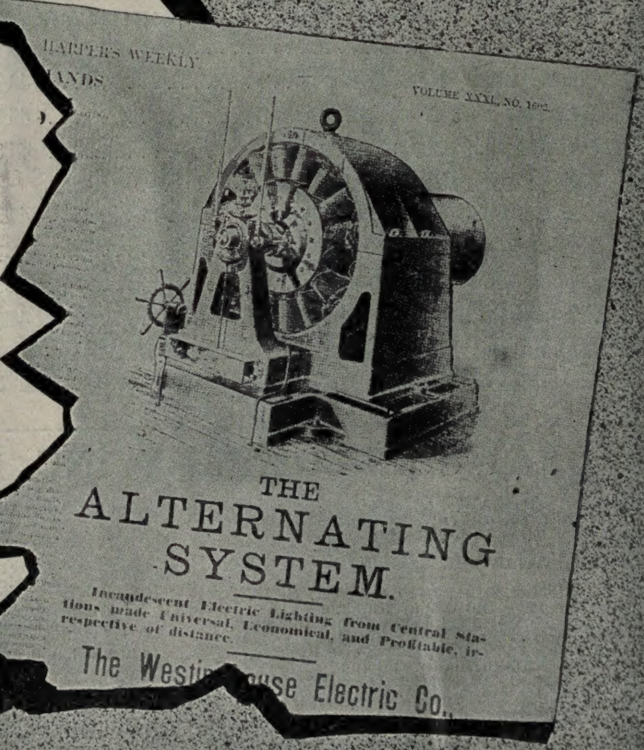
As a consequence, distribution lines stretch out over this country like mighty arteries, supplying power for all purposes.

The clipping from Harper's Weekly shows the first **Alternating** Current Generator advertised in this country.

The illustration above shows a modern Westinghouse Alternating Current Turbine-Generator in the plant of the Tug River Power Company.

Westinghouse Electric
& Manufacturing Co.
East Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC



HARPER'S WEEKLY

VOLUME XXXI., NO. 1602.

THE
ALTERNATING
SYSTEM.

Incandescent Electric Lighting from Central Stations made Universal, Economical, and Profitable, irrespective of distance.

The Westi use Electric Co.,

Congested City Service

The comparatively simple stopping requirements of the single trolley car in slow-moving, congested city traffic, are best met by the WESTINGHOUSE straight air-brake with emergency feature. Send to our nearest office for Descriptive Catalogue No. T2012-B.

Brake Building our Business for a Lifetime.

Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

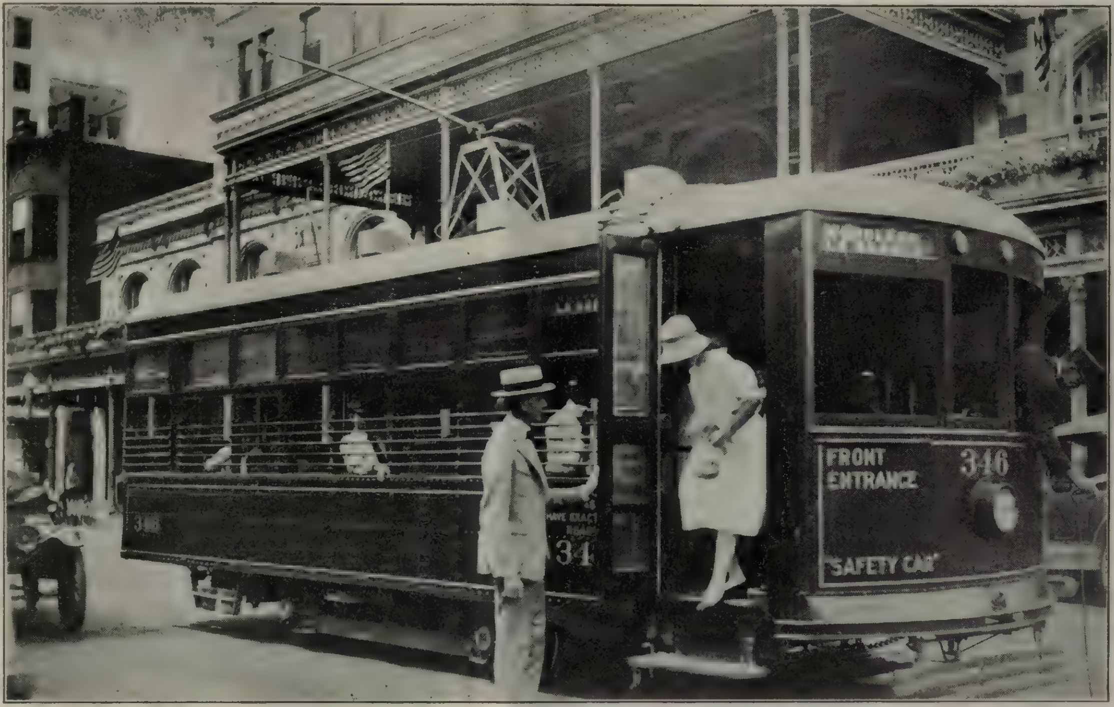
Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Col.
Houston, Tex.
Los Angeles, Cal.

TRADE MARK

Mexico City
New York, N. Y.
Pittsburgh, Pa.
San Francisco
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

The Heaviest Traffic Center in Houston, Texas

with the RICE HOTEL in the background,



sees the Safety Car pass in each direction with clock-like regularity on as low as four minute headway, with a minimum cost in LABOR and FUEL.

Note the active scene in the above photograph—school children, three of them exiting, appreciate the convenience and orderliness of the Safety Car. The switch is being thrown while passengers are exiting—no time lost. By the time Mr. Man can board, the operator will be ready to care for his fare, and the car as well as the Ford will move off promptly.

Thousands of business-like scenes such as this are being enacted every day by Safety Cars, and all the while they're safe as safe can be —through the use of Air Brake and Safety Car Control Equipment, as sold by—

Safety Car Devices Company

Main Office: Boatmen's Bank Bldg., St. Louis

CHICAGO
Railway Exchange Bldg.

NEW YORK
City Investment Bldg.

PITTSBURGH
Westinghouse Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

O-B PRODUCTS

Quality First

O-B Extruded Ear. (Runner piece extruded metal. Malleable boss clinched and riveted on.)

On Round Wire Generous Amount of Metal in Lips

On Grooved Wire Perfect Wheel Clearance

On Figure 8 Wire Perfect Wheel Clearance

O-B Extruded Ears Will Save for You

There are five big reasons for putting O-B Extruded Ears on the trolley—denseness, toughness, ductility, accurate dimensions, uniformity.

All of these are natural consequences of the extrusion process which consists of forcing red-hot (not molten) brass through a die under tremendous pressure.

Because O-B Extruded Ears are so dense and tough they resist wear remarkably.

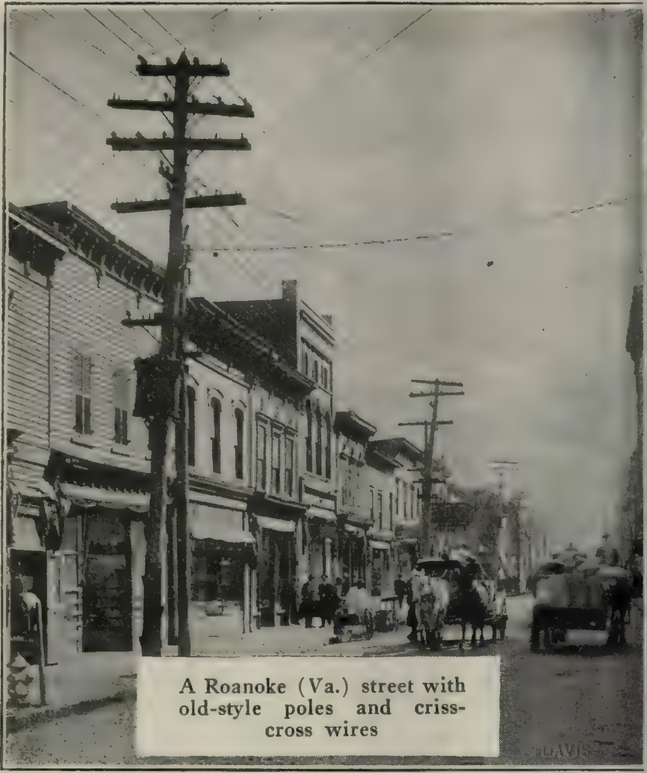
Because they are ductile and accurate in dimensions they fit the wire tightly and smoothly. So arcing is reduced materially.

Because they are uniform you can be certain that the long life you get from your trial installation is a true index of the saving you can make on the entire road.

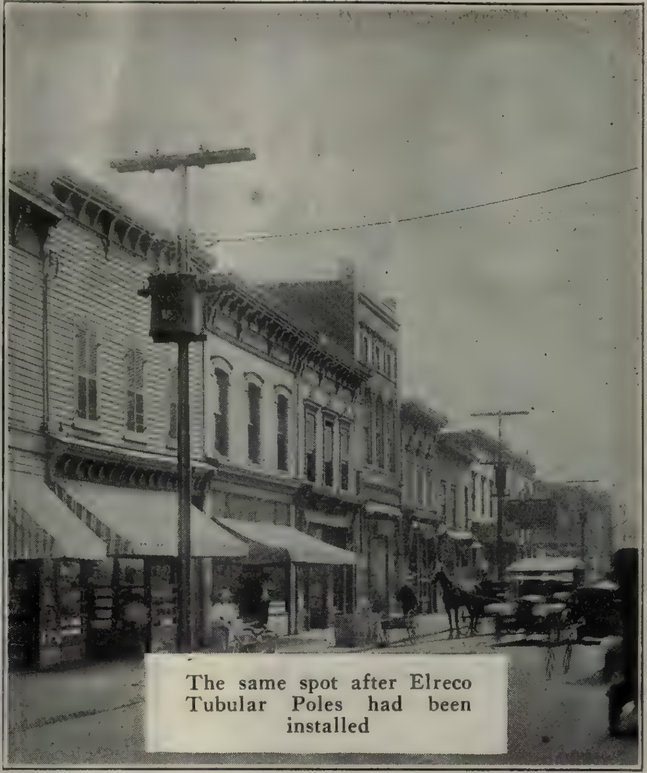
Here is the surest, fairest way to find out what O-B Extruded Ears will save you—stagger them on the line with other ears and keep tabs on results. Write us about it.

The Ohio Brass Company, Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco



A Roanoke (Va.) street with old-style poles and criss-cross wires



The same spot after Elreco Tubular Poles had been installed

Before and After in Roanoke, Va.

Notice the Difference Made by Installing

Elreco Combination Poles

Think what that maze of criss-cross wires, in the picture to the left, means to the lineman and trouble hunters.

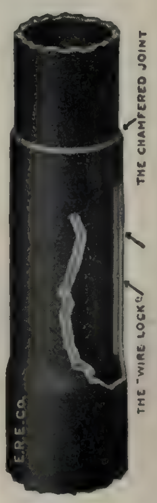
The waste in wire, insulating material and unnecessary labor are evident to the practical railway and central station man.

Then look at the clean-cut efficient Elreco installation in the other picture.

Elreco Combination tubular steel poles carry power, trolley and light wires on the same pole.

These poles are unusually strong. The patented wire lock absolutely prevents telescoping and the "chamfered joints" seal the pole against water and rust.

Let us show you the advantages and economy of using these poles.



Elreco Tubular Poles combine lowest cost, lightest weight, least maintenance, greatest adaptability.

Electric Railway Equipment Co.

Cincinnati, Ohio
New York: 30 Church Street

Wasted—

35% to 50% of TRACK MATERIAL

INTERNATIONAL STEEL TWIN TIES

Obviate this wasted material and labor

Of What Engineering Value Is the Concrete or Ballast Between Wooden Ties? Absolutely None. It Represents an Economic Loss of Track Material and Labor.

Steel Twin Ties are designed to overcome just that condition. The effective tie bearing area is placed at the top of the tie and parallel with the rail.

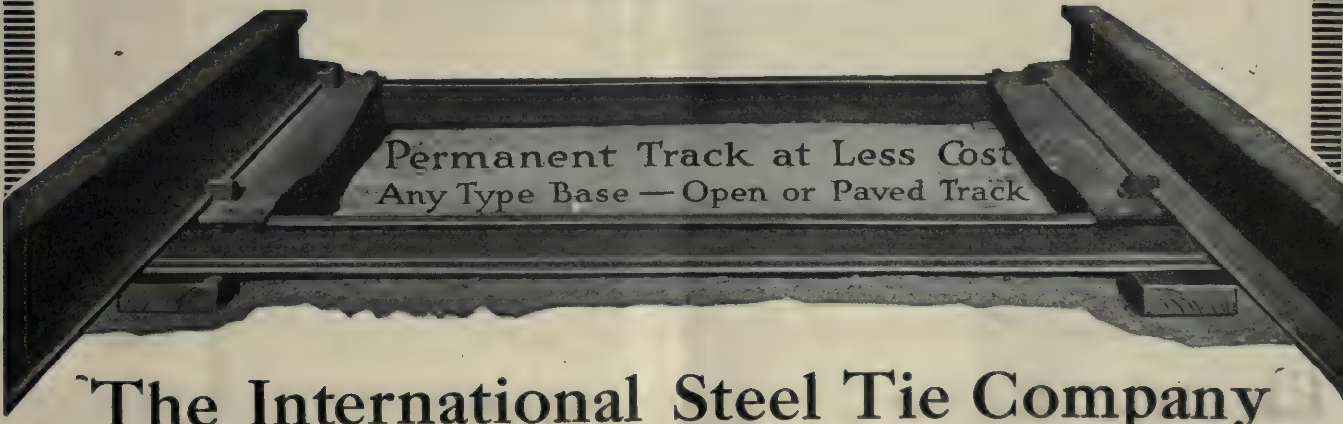
There is an engineering reason for every ounce of metal in a Steel Twin Tie. The 13 in. x 36 in. trussed plates carry the track loads and the 3 in. channels serve as anchorages and tie rods.

Seven inches of concrete beneath the tie plate puts just that much in effective bearing. An inch more than is usually used. And at the same time the excavation and concrete quantities below base of rail are reduced one-half.

Any way you look at them they are engineeringly right. The longer you delay your purchase of some of these ties the more money you waste in extraneous track materials and labor.

Ask our users if you want our best sales argument. If you are convinced ask us for a quotation and delivery.

Prompt deliveries made from stock.


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

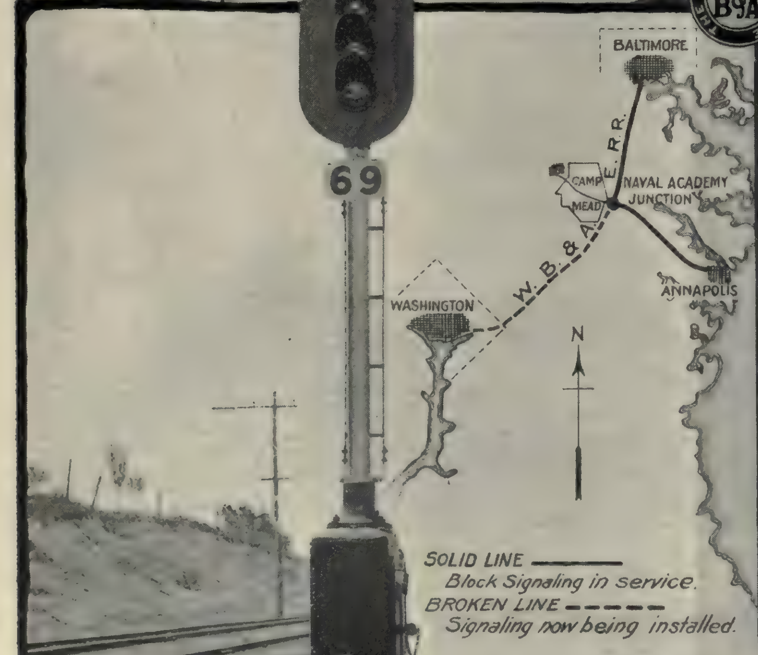
General Sales Office and Works: Cleveland, Ohio

Representatives:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.

AUTOMATIC BLOCK SIGNALING

Protecting High Speed Traffic on the WASHINGTON BALTIMORE and ANNAPOLIS ELECTRIC R.R



UNION

Style "N" Color Light

Signals

controlled by continuous

A. C. Track Circuits

make

Maximum Operating Speed

possible on the W. B. & A. with

Absolute Safety

to the important interurban freight and passenger traffic now moving in and out of Baltimore and Washington from naval training stations, cantonments, etc.

"Union" Standard Uniform Equipment Throughout

Trade US Mark

Union Switch & Signal Co.

Trade US Mark

SWISSVALE, PA.

"GOLDEN GLOW" Headlights at Houston

Good looks are not the first things looked for in a headlight, but the "Golden Glow" is just as handsome in the daytime as it is efficient in the night time.

The greenish glass reflector and modest size of the "Golden Glow" are mighty different from the spotted clumsy headlights of the past.

There are seventy-five of these headlights in Houston. Nor are these the only Essco specialties there. Keystone Trolley Catchers, Illuminated Car Signs, Automotoneers and Faraday buzzers also are proof of Houston's high standards.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

"War Service and Efficiency"

is the particularly appropriate topic
selected by the editors for the

Annual Convention Issue

of Electric Railway Journal
September 28

The most important electric railway executives will attend the New York meeting of the American Electric Railway Association. Their deliberations and decisions will be of momentous importance.

Vital questions face the industry. The New York meeting will settle many of them.

Naturally, electric railway men everywhere have their attention focused on the meeting. In that connection they will as in past years expect, welcome, read, file and repeatedly refer to the Journal's Annual Convention Issue because it will bring the industry the most thorough, complete and illuminating series of articles on many of the questions which the New York meeting will decide.

It is data of the kind which this issue will contain that will help toward momentous decisions at the meeting.

As in past years, this issue will be mechanically on a par with its editorial excellence and advertising value.

The Report Issue

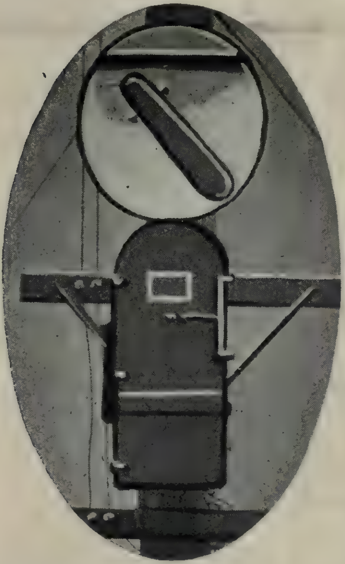
will bring to a waiting field the first and most nearly complete news of what happened at the meeting. Naturally, therefore, this issue ranks in importance second only to the Convention Issue of the Electric Railway Journal.

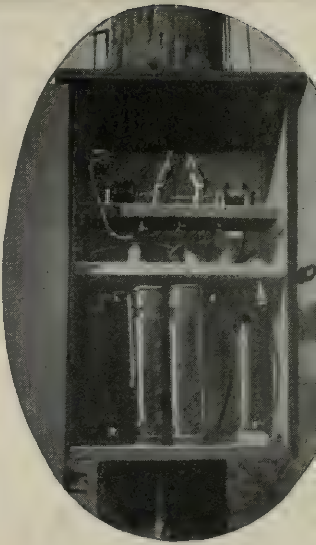
The Circulation of Both Issues

will be all-inclusive. American electric railway buying power will be saturated practically 100%.

If you haven't sent in your space reservation for these two important issues, we urge you to do so immediately. There is just about time to handle your copy. Regular rates apply.

ELECTRIC RAILWAY JOURNAL
Member Audit Bureau of Circulations
10th Avenue at 36th Street, New York





CHAPMAN Safety Signal

Make It Unnecessary to Leave the Car Unattended

It isn't safe to use hand-throw signals in any event but it's doubly unsafe in one-man car operation because—

The Railway's liability is increased if an accident occurs while the car is unattended—

Aside from the unauthorized ingress and egress of passengers.

Discomfort from open doors in bad weather—

And the possibility of misuse of platform apparatus by the idle-handed passenger.

These qualities of Chapman signals assure you top-notch safety in either one-man or two-man car operation.

Charles N. Wood Company

14 Federal Street, Boston, Mass.

Phono-Electric

Along the Laurell Line

Because of its consistently long life, the New Orleans Railway & Light Company uses Phono-Electric Trolley Wire on subsidiary routes, like the Laurell Line—a branch of the Magazine Street line—

just as it does on its more important traffic routes.

Thus the 8 miles of single track of the Laurell Line have been equipped with Phono-Electric Trolley Wire for five years.

The experience of New Orleans proves that Phono-Electric qualities make it practically universal for city conditions.

Bridgeport Brass Company

Bridgeport Connecticut

81

The above view, No. 1, shows **Northern White Cedar Poles** in service in the lines of the Detroit United Railway Location at Nine Mile Road and Woodward Ave. They carry the following load: one 500,000 c.m., and 350,000 c.m., bare cables; two 3/0 grooved copper trolleys; two No. 9 bare iron wires; five No. 9 w.p. iron wires.

Pole at right in view No. 1 is also built of **Northern White Cedar Poles.**

View No. 2 shows lines of the Dubuque Electric Company, Dubuque, Ia., built of 45 ft. **Northern White Cedar Poles,** carrying the following circuits: 7 street lights—14 No. 6 wires; four 2300-volt primaries—eight No. 0 wires; one 3-phase, 2300-volt power—three No. 1 wires; 500-volts d. c. power—two No. 0 wires. These poles were set in 1906.

NORTHERN WHITE CEDAR ASSOCIATION, Minneapolis

Carry On!

"British manufacturers who have not a dollar's worth of merchandise to sell, whose entire plants are employed on Government work, are keeping their advertising continuously before the public, because while they are perfectly willing to turn their profits over to the Government, while they are perfectly willing for the sake of winning the war to have their factories commandeered and their normal businsss completely stopped, yet they are *not willing to sacrifice their good-will; they are not willing to have their names or their products forgotten.*

"And so they continue their advertising, continue building their good-will, so that when the war shall be won there will be an immediate demand for the billions of dollars' worth of merchandise that their greatly enlarged factories will then turn out.

"This is a time when every manufacturer, every business man, should look far ahead. Good-will cannot be built in a day, even by advertising. The war will not last always. We have all seen the mistake of being unprepared for war; it is almost as great and serious a mistake to be ***unprepared for peace.***

"What are you going to do with your acres and acres of enlarged factory space now employed in the making of War Products all over America, if you don't build good-will now for the goods you are going to make when the war is won? How are you going to keep the smoke coming out of your factory chimneys after peace is declared, if you don't keep your name constantly before the public now, and build a demand for your peace-time products that will ***insure a satisfactory business the minute you stop making munitions or other war supplies?"***

—From an Address made in New York by Mr. Val Fisher, London Publisher, Member London Chamber of Commerce, Associate Member American Chamber of Commerce in London.

Electric Railway Journal
Tenth Ave. at 36th St., New York

USE ARMCO GALVANIZED STRAND

for Span, Messenger and Catenary Wires

AMERICAN
ARMCO
INGOT IRON

The trade mark ARMCO carries the assurance that the iron bearing that mark is manufactured by The American Rolling Mill Company with the skill, intelligence and fidelity associated with all its products, and hence possesses in highest degree the merit claimed for it.

Armco Galvanized Strand is practically pure iron with an extra heavy surface covering of spelter. The whole is peculiarly free from the carbon, sulphur, phosphorous, scale and other impurities that make ordinary steel wires corrode and break in a very much shorter time.

The breaking strength is over 80,000 pounds per square inch of section, and size for size Armco Strand will be found much more satisfactory than steel wire.

Armco Strand is not nearly as quickly affected by moist or salt air or by the corroding fumes found in manufacturing districts. The slight extra initial cost over that of ordinary strand is far more than repaid in lessened maintenance expense and lessened frequency of breakdowns.

ASK US TO SUBMIT INTERESTING FIGURES AND DATA.

PAGE STEEL & WIRE CO.

Established 1883 *as Page Woven Wire Fence Co.*

Makers of "Copperweld" Copper Clad Steel Wire; Armco Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wrie of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

FACTORIES: Monessen, Pa., and Adrian, Mich.

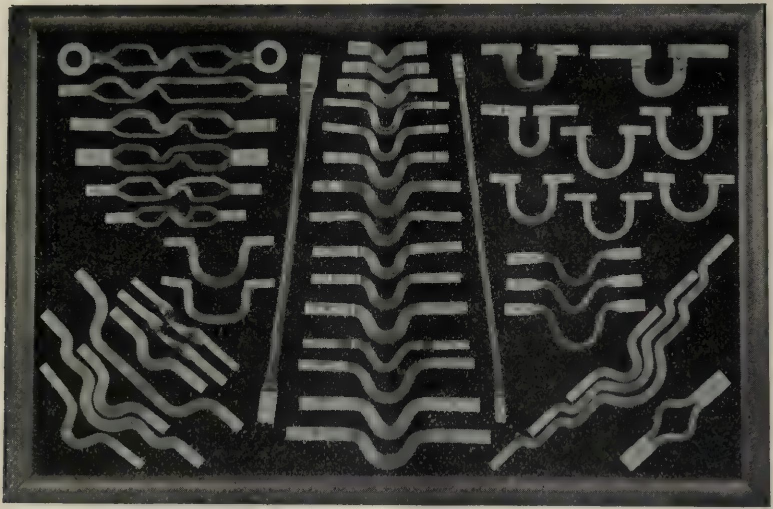
SALES OFFICES: 30 Church Street, New York
WESTERN REPRESENTATIVES: Steel Sales Corporation, Chicago

STEEL AND WIRE
PAGE
QUALITY PRODUCTS

ERICO
THE LINE OF LEAST RESISTANCE

ERICO
Rail Bonds

for a permanent, low resistance contact



Erico rail bonds have all the natural elasticity of new copper wire, for the wire used in their manufacture is annealed before, not after, the bonds are made.

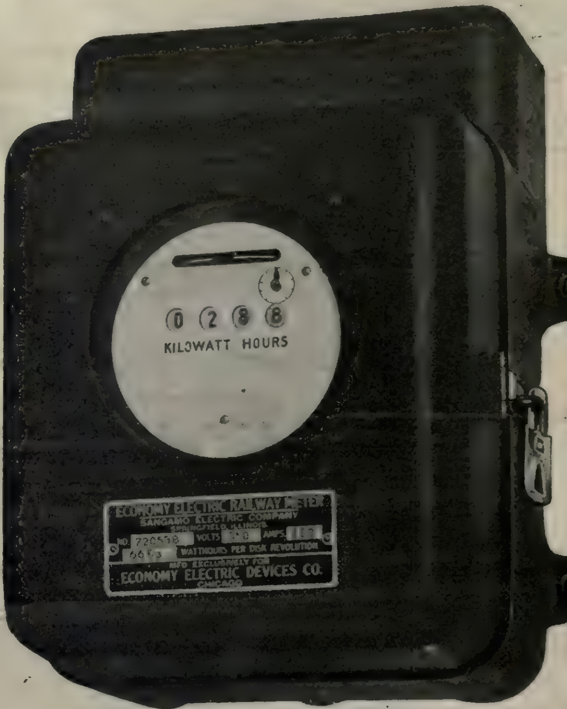
Erico bonds are manufactured cold — the copper is not heated in any way after it is taken from the reel. This eliminates all danger of frequent heating and overheating.

Erico bonds, properly welded, insure a permanent, low-resistance contact which will not depreciate through action of the elements.

Write for Prices and Descriptive Matter

The Electric Railway Improvement Co.
Cleveland

Observe the figures on the face of this meter



Is there anything complicated about them? As a matter of fact, aren't they as simple as the figures on a clock—if not simpler? That's all the motorman has to read when the

ECONOMY METER

"The Watchdog of Your Power"

is used as an energy-checking and saving device on his car.

Simple? So simple that a school boy could take the reading.

Neither theorizing nor attacking argument will prove a point—only the underlying facts are conclusive. If any railway man is interested in installing an energy-saving device on his road, he will most certainly want to investigate the notable superiority of the ECONOMY METER for this service.

The ECONOMY Meter has no paper tape rolls to keep filled; no ink supp to maintain; no clock mechanism to wind, oil and adjust; no fuses to blo and be replaced; no relays to stick or burn out; no pneumatic plungers to kept in such condition that they wi function uniformly; in fact, it has parts that are ever differently affecte by wet, dry, hot or cold weather cond tions, water or scale in the brake syster Maintenance work on Economy mete can be done as a bench job—no need hold cars out of service while makin repairs.

Meter The Energy—That's What You Want to Save

Economy Electric Devices Company

L. E. Gould, *President*

Exclusive Sales Agent Sangamo Economy Railway Meter

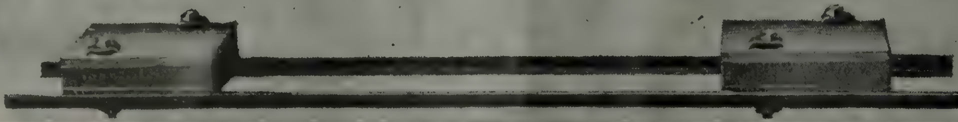
Old Colony Building, Chicago

Wetmore-Savage Co.
Boston, Mass.
Burton R. Stare Co.
Seattle, Wash.

Ludwig Hommel & Co.
Pittsburgh, Pa.
Rumsey Electric Co.
Philadelphia, Pa.

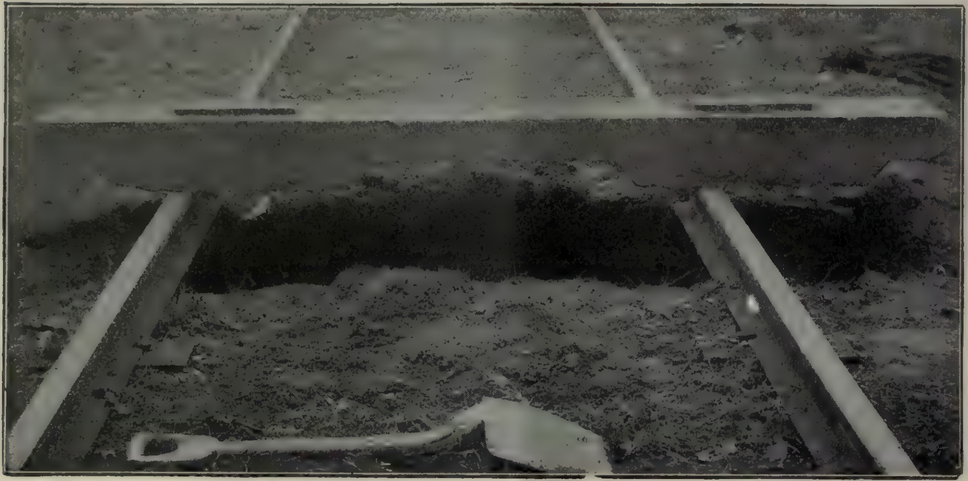
L. A. Nott
San Francisco, Calif.
J. G. Monahan
Los Angeles, Calif.

The MECHANICAL RAILWAY TIE



Here is a Demonstration

The mechanical tie shown in this illustration was modeled in concrete for open track use.



It was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for **Six Years.** Its condition shows plainly—it's as good as when it was installed.

The 6-in. steel I-beam, shown here, has been in use for **Five Years** under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely **one** of a number similarly dented and hammered.

Just Study the Pictures

Then write us for further details.

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO

SHUT OFF THE POWER!" "DON'T FAN THE AIR!"

It behooves you to hooverize your motormen.

It Puts a Time Clock On Your Power Cost Per Car

The Arthur Power Saving Recorder

THE ARTHUR POWER-SAVING RECORDER does that and in doing it puts in your hands the means of educating every one of your motormen to operate cars with the utmost *economy* and *safety*.

It will not *of itself* reduce consumption of power or increase safety of operation. No device or invention so far produced will do that without the co-operation of the human element.

Even the automatic track circuit signal systems will not prevent collisions if the workman wantonly ignores the signals. If the electric car operator is encouraged to follow the signals which the Arthur Recorder is constantly giving him he will use the least amount of power necessary to make his run on schedule. He will use his brakes smoothly and no more than necessary. He will have his car under constant control. He will operate safely.

He will save power—prevent accidents—decrease wear on brake-shoes, wheels, and car equipment in general. The use of the Arthur Recorder will enable you to educate and train your car crews to do all these highly desirable things.

It has fully demonstrated its ability to do this.

THE ARTHUR POWER-SAVING RECORDER CO.

Second National Bank Building, New Haven, Conn.

What you can next Liberty Loan

Read this carefully—then ACT

THE three Liberty Loan issues already successfully floated have been put over by the win-the-war spirit of the American people.

In connection with the great work of awakening and quickening to action the spirit of war sacrifice which has been the greatest factor in the success of Liberty Loans it would be impossible to put too high a valuation on the splendid voluntary work of American business men, bankers, labor leaders, and moulders of thought in all professions and occupations.

The very success of this volunteer leadership in creating enthusiasm has shown the desirability of organized methods for increasing its usefulness. And particularly to suggest to those leaders who feel that their circle of action is relatively small the enormous amount of good they can do as a whole *if each no matter how small or great (relatively) his sphere may be, will act with enthusiasm and system.* The great factory or store, society or club, church, or other organization with, say 5000 employees, members, or audience, does a great work in "selling" the Liberty Loan idea to such an aggregation. But that work is fully matched in aggregate importance by a hundred such institutions whose average payroll, membership, or audience, comprises only fifty persons each.

The nation has much other work to do. The Liberty Loan drives are necessarily carried through largely by volunteer work. In consequence they must be limited to specific brief periods for the actual subscription to the bonds.

THESE brief sharp campaigns have the advantage of building up white-hot waves of enthusiasm, but it is extremely difficult in such periods to secure close contact with *all* the wage-earning and money-making units of the public and especially to bring home personally to each individual the important serious personal relation which he or she should have to the war and to the successful financing of it.

To the accomplishment of that great end it is now proposed that the leaders of thought and action in America and especially the *employers of labor*, great and small, whether in store or factory, whether engaged in production or distribution,

hold a meeting of your employees shortly previous to the Fourth Loan campaign, not to take bond subscriptions but to arouse serious enthusiasm for the forthcoming Loan.

WHERE organizations are small, as for example small stores, similar organizations in the same or related lines of business can be invited to participate in one meeting. As for example, all the grocers in a small city, or all those in a given section in a large city, might get together in one meeting. But it would be a grocers' meeting. In such cases it would usually be wise to keep related trades together.

Whether the audience be great or small, every effort should be made to "stage" the meetings effectively, to make them interesting and instructive and above all to give *employees themselves* an opportunity to speak, to discuss, to suggest, to enthuse their fellow employees.

"Win-the-War" Meetings need not be limited to gatherings of employees. They can be equally effective if organized as "town meetings"—or by clubs, societies, churches, lodges or similar institutions. Leadership, organization, and a definite program will work wonders.

o NOW to help the

It is not essential that such meetings be *called* Liberty Loan meetings—they would better be announced as "Win-the-War" meetings, and above all it should be made clear that no attempt will be made at these meetings to secure or accept subscriptions for Bonds or money for any purpose whatever—but in all the speaking and discussion attention should be largely devoted to the forthcoming Loan.

The Fourth Liberty Loan Campaign will begin on September 28th.

All of the preliminary meetings should be held not earlier than September 10th and not later than September 25th, unless there are special circumstances which would make an earlier or later meeting expedient.

THE LIBERTY LOAN BUREAU has prepared a booklet setting forth "Suggested Programs for Meetings to Prepare for the Fourth Liberty Loan."

They have asked us as publishers of a business paper to bring this suggestion for patriotic service to the attention of our readers and to urge its hearty adoption by all stores, factories, employers of labor in any capacity, societies, clubs or organizations of any kind who can arrange such meetings.

We have been furnished with copies of the booklet giving "Programs for 'Win-the-War' Meetings"—and will send a copy promptly to anyone signing the coupon below and mailing it to us. The signing of the coupon is your pledge to hold such a meeting either of your employees or of some similar group which you can bring together previous to the Fourth Liberty Loan Campaign and your pledge when received will be turned over to the Liberty Loan Bureau and officially acknowledged.

Such meetings organized in the "Win-the-War" spirit will not only help tremendously to insure 100 per cent subscriptions to the Fourth Liberty Loan among employees of industrial and commercial concerns, they will do more than almost any other one thing could to develop among all ranks of the public the stern spirit of sacrifice and the necessity for loyal, constant, steady service of each and every one in the great national work of victory for the cause of Liberty and Democracy.

They will serve to educate and make clear to all the vitally important way in which work and sacrifice here in our midst help and sustains the work of our fighting men "over there."

This is an opportunity for every American business man to do a great and helpful work for the Fourth Liberty Loan and one which will help win the war.

There is plenty of time for efficient action. There is no time to lose in preparing for that action.

Electric Railway Journal.

Sign the Coupon
Mail it to

Electric Railway Journal
10th Ave. at 36th St. New York City

Get the Book
Hold Your Meeting
and
make it a
"hummer"

This space contributed to the winning of the war by Electric Railway Journal.

I pledge myself to organize and hold a "Win-the-War" meeting previous to the opening of the Fourth Liberty Loan Campaign in order to help float the Loan.

Send me †........ copy of Liberty Loan Committee Booklet giving suggestions for Programs for such meetings.

Signature..

Position or Title..

**Firm*..

Street No...

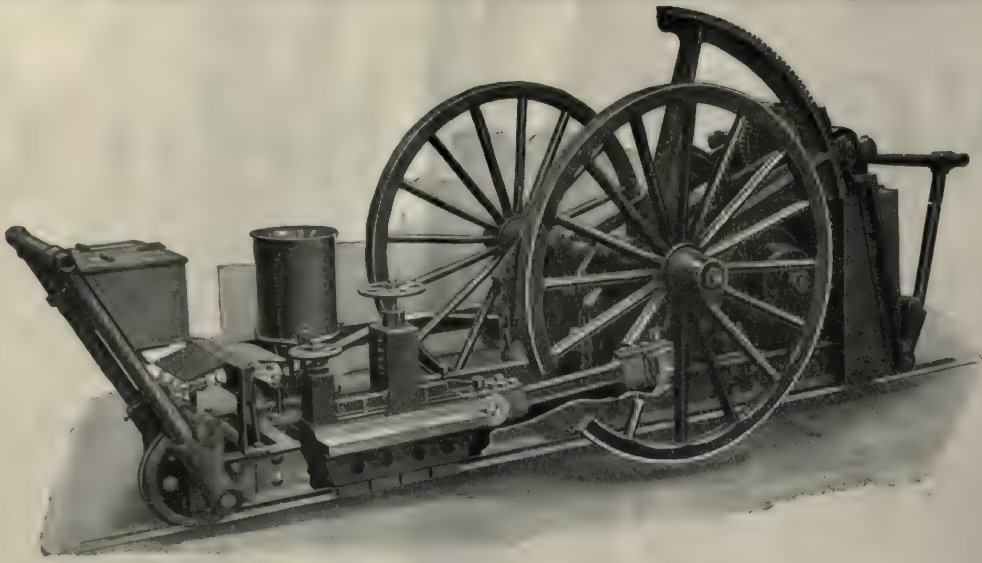
City..

State..

Date..............................

* If a Society, Club or similar organization give name here.

† If more than one copy is desired state number.



The Dollars and Cents Value of Even a Short Increase of Track Life

No one would be foolish enough to contend for a moment that the consistent and universal use of

RECIPROCATING TRACK GRINDERS

would forever eliminate the necessity of replacing track.

Track deteriorates from many causes and like everything else will not last forever, no matter how well maintained.

It has, however, been fully and completely demonstrated that the careful maintenance of track and the use of Reciprocating Grinders will tremendously prolong the useful life of track even when conditions are so bad as to make replacement apparently necessary. Many companies have added years of life to apparently hopeless track by grinding out the bad spots with a Reciprocating Grinder.

Even where such prolongation of usefulness is for a relatively short period the money saving is very great.

For example, if the expenditure of the 15 million dollars or more spent by electric railways in 1917 for replacing track had been delayed by only one year it would have saved the industry at least the interest charge on that amount for one year. And this interest charge at 5% for one year would have been

Seven Hundred and Fifty Thousand Dollars

The use of Reciprocating Grinders, especially if used when corrugations or cupped joints first appear, prolongs the life of track for *many* years.

RAILWAY TRACK-WORK COMPANY
30th and Walnut Streets, Philadelphia
AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago

Why They Save Time in Passenger Interchange

ON MONTREAL'S TRAINS

It's partly the clever combination of rear-entrance leader and front-entrance follower whereby the load is evenly divided.

It's partly the arrangement for placing the cross-seat down front in the first car and back in the second car.

But it's largely because of the use of

National Pneumatic Door and Step Control

whereby the conductors secure quick opening and quick closing as well without interfering with the prompt collection of every fare or with the desire of the passenger to get to his seat as quickly as possible.

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York
515 Laflin St. Chicago

TRADE MARK

Voltage—Heat—Moisture

to an excessive degree are the source of most of your power losses and ordinary insulating material offers only limited protection.

Irvington Black Varnished Cambric

gives you full protection against severest usage.

Tested and Proved by Time

For coil repairs, for taping cable leads and insulating windings of any character.

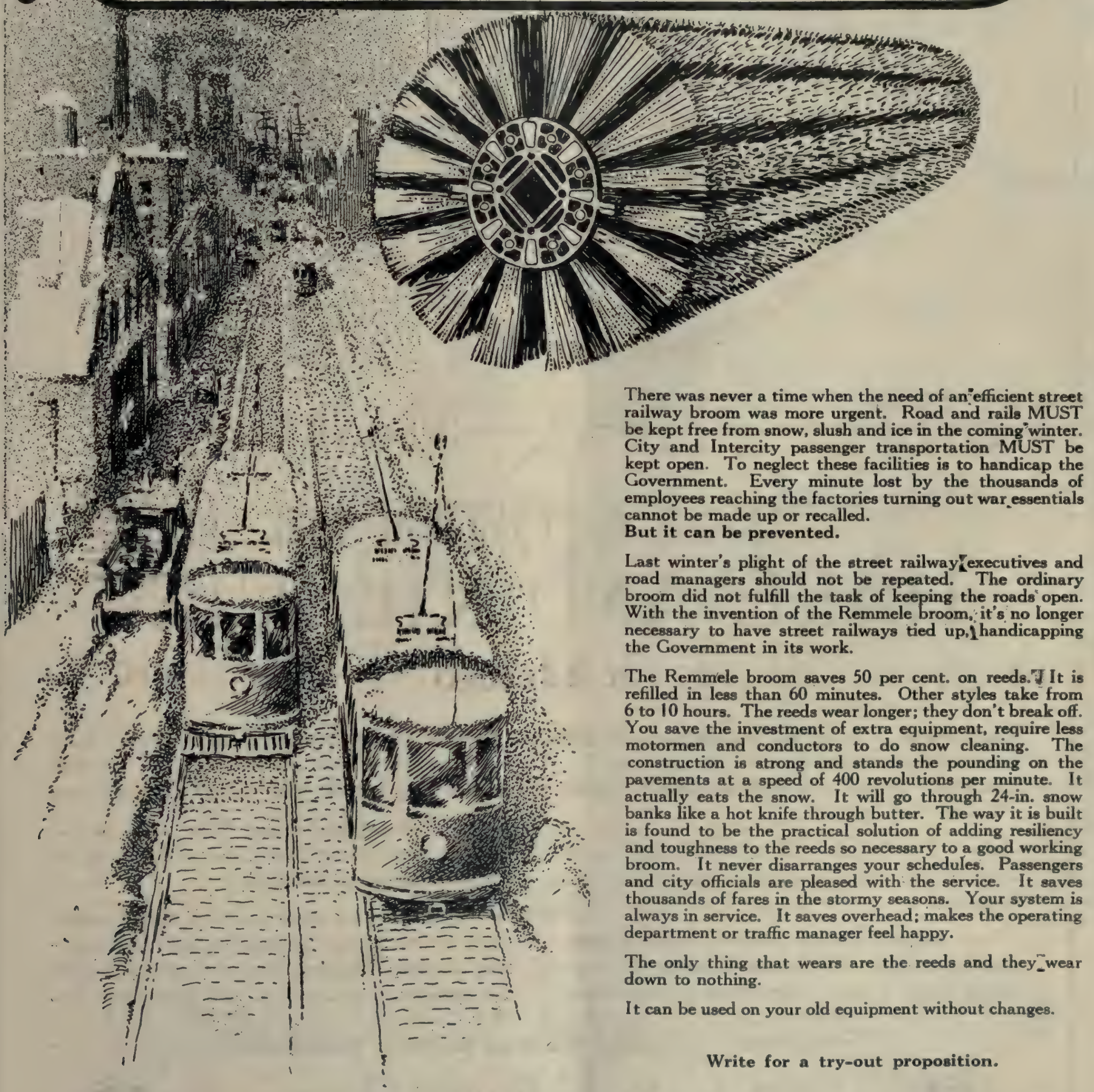
Black and Yellow Varnished Cambric
Black and Yellow Bias Cambric Tape
Oiled Silks **Oiled Papers**
Black and Yellow Insulating Varnishes
Black and Yellow Flexible Varnished Tubing

IRVINGTON VARNISH & INSULATOR CO.

Irvington, New Jersey.

Remmele Broom

MAKES THE SWEEPER



There was never a time when the need of an efficient street railway broom was more urgent. Road and rails MUST be kept free from snow, slush and ice in the coming winter. City and Intercity passenger transportation MUST be kept open. To neglect these facilities is to handicap the Government. Every minute lost by the thousands of employees reaching the factories turning out war essentials cannot be made up or recalled.
But it can be prevented.

Last winter's plight of the street railway executives and road managers should not be repeated. The ordinary broom did not fulfill the task of keeping the roads open. With the invention of the Remmele broom, it's no longer necessary to have street railways tied up, handicapping the Government in its work.

The Remmele broom saves 50 per cent. on reeds. It is refilled in less than 60 minutes. Other styles take from 6 to 10 hours. The reeds wear longer; they don't break off. You save the investment of extra equipment, require less motormen and conductors to do snow cleaning. The construction is strong and stands the pounding on the pavements at a speed of 400 revolutions per minute. It actually eats the snow. It will go through 24-in. snow banks like a hot knife through butter. The way it is built is found to be the practical solution of adding resiliency and toughness to the reeds so necessary to a good working broom. It never disarranges your schedules. Passengers and city officials are pleased with the service. It saves thousands of fares in the stormy seasons. Your system is always in service. It saves overhead; makes the operating department or traffic manager feel happy.

The only thing that wears are the reeds and they wear down to nothing.

It can be used on your old equipment without changes.

Write for a try-out proposition.

Remmele & Maier

CHAS. E. MAIER, Pres. and Mgr.

370-372 South 7th Street, Newark, N. J.

Around the Continent with
HALE AND KILBURN
at Chicago

Read what a veteran conductor on the Van Buren Street line, Chicago Surface Lines had to say about Hale and Kilburn "Walkover" seats.

"Say, I've often blest the easy way these Hale and Kilburn seats can be reversed.

"You see, when we switch back downtown here at Plymouth Court, it's not often that I have the chance to reverse these fourteen cross seats because there are always a few people left at the end and a big bunch also waiting to get on.

"But you ought to see how even a kid can reverse these seats in a jiffy with no slam or bang or breaks.

"If it wasn't so easy to turn those seats, they'd surely be yammering and hammering at me. Believe me, it's mighty glad we conductors are that the company has

Thousands of these Hale and Kilburn Walkovers!"

Hale & Kilburn Corp.

Philadelphia
Washington
St. Louis

New York
Atlanta
Chicago

San Francisco
Louisville
Dallas

She's too busy to bother with a hand operated heating system

Making change—opening doors, closing doors, watching the loading—starting the car.

—too busy to give attention to the heating.

—and exercising too much to know whether the car is cold.

Thermostatic Control and Consolidated Heaters

Consolidated Thermostats regulate the heat at the exact degree you have decided on and then the Consolidated Heaters deliver just that degree of heat—no more or no less.

Their automatic heat control takes care of the morning chill—the warm mid-day—and the packed "stuffy" car of the rush hour.

Consolidated Thermostats and Consolidated Heaters couple satisfied riders with reduced power consumption and give the Conductress full time for looking after fares and passengers.

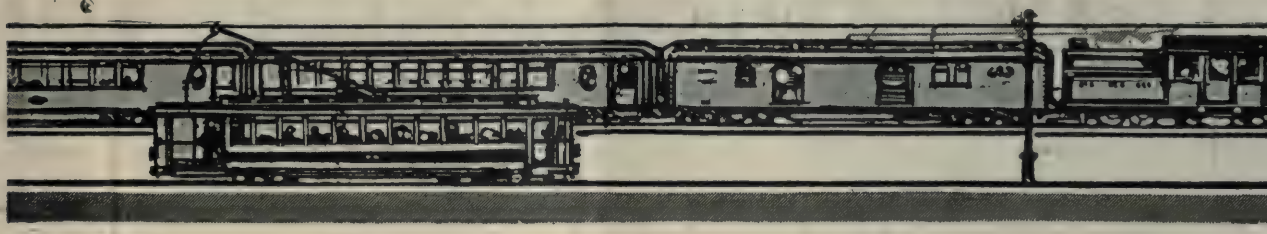
CONSOLIDATED SPECIALTIES

Heaters—Thermostatic Control—Pneumatic Door Operators—Car Starting and Stopping Signals—Special Resistances.

Makers of the Famous Consolidated Thermostat

CONSOLIDATED CAR-HEATING COMPAN

ALBANY NEW YORK CHIC



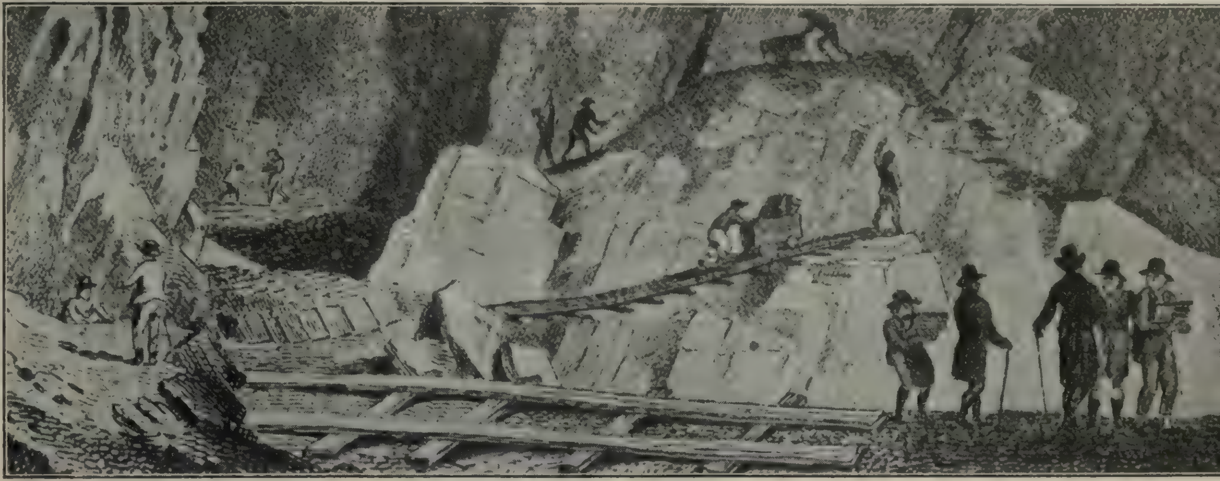
Read
What
One
User
Writes
About

The Bonham Traffic Recorder

"These recorders give us information which enables us to determine at a glance the distribution of travel; showing from and to what stations each passenger rides, enabling us to determine at what points on the lines is the maximum load; and the number of passengers handled to and from any station about which there may be a question.

"In one case we had to cut out stops on some limiteds to enable us to make the time. The record showed the station which had the least travel and exactly the amount of travel each day. This put us in a position to determine whether it would be policy to cut out the stop and also to answer the complaints of the people at that station after the stop was cut out. There is no guess work about the Bonham Traffic Recorder. The data are before you and you can get almost anything you want from it."

The Bonham Recorder Company
Hamilton, Ohio



Railways had their origin in tramways or wooden wagonways used in the sixteenth century for conveying coal near Newcastle, England. In time the wooden rails were covered with a thin sheet of iron. Iron wheels were introduced about 1734 and the first cast-iron rail appeared about 1767.

The Rapid Progress Made in Transportation

is instantly suggested by the picture of this old tramway. One hundred and fifty years elapsed between the time this crude equipment was used and the date of the inauguration of the first American electric railway.

It is a period of only about 30 years from the date of the first electric car in America to the comfortable, high-speed, efficient electric car of today.

Naturally this rapid progress in modern methods would not have been possible without concurrent progress in every department of the railway business.

Greater speed, increased weight of equipment, longer runs and other factors have naturally created a need for more efficient lubrication.

Galena Oils

and the service that goes with them have met this need throughout the whole period of modern railway development.

Galena methods have never stood still. They have always improved.

Galena-Signal Oil Co.

Franklin, Pa.

CROUSE-HINDS

Safety Panels

"Which button next, Daddy?"

New Catalog Bulletin No. 1D now Ready
Write for Your Copy Today

Crouse-Hinds Company
SYRACUSE, N. Y., U. S. A.

NEW YORK BOSTON CHICAGO

Rico Coasting Recorder

Adopted by The Aurora, Elgin and Chicago Railroad

Third Rail Division

The Fastest Electric Railway System in the World Having the Most Severe Service

CARS WEIGH 45 TONS—equipped with 4 G.E. 66, 125 H.P. Motors—geared to 70 miles per hour—with schedule speed of 43.9 M.P.H. —and are operated in trains of from 2 to 5 cars.

Extensive tests have demonstrated that even in this class of service there is "coasting" and by equipping these cars with RICO COASTING RECORDERS the motormen will know just *how well* they operate. The PRINTED RECORD of their daily performance—in terms that do not take an engineer to understand—obtained by their individual key (instead of being written down by hand) will be the means of obtaining the full interest of the men —resulting in *conservation of coal* on this very important system.

This railroad company's engineers estimate that the operation of Coasting Recorders (45) on these 3rd Rail Lines will SAVE 4000 TONS OF COAL PER ANNUM.

Watch for the actual results

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

Make Your Current Follow the Crowds

If those new factories on the outskirts of the town are overtaxing the feeders in that section, don't worry. There is a way to give the best of service whenever traffic demands it without stringing new and costly feeders. The means for accomplishing this are embodied in the

G-E Automatic Sectionalizing Switch

installed across section insulators.

If low voltage occurs on one section, due to heavy loads, the switch mechanism is affected and adjacent underloaded or idle feeders are automatically connected to the loaded section. An interchange of current results which raises the potential until the two sections are equalized.

On some systems where these switches have been placed in operation the current interchange during rush hours has totaled 600 to 700 amps., with a resulting potential increase of 100 to 150 volts.

If your service is affected by rush hour demands, consult with our Specialist at the nearest G-E Office.

Call up or write our nearest office for further information.

GENERAL ELECTRIC COMPANY

General Office, Schenectady N.Y. Sales Offices in all large cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, September 7, 1918 *Number 10*

A New Plan for the Liberty Loan Campaign

THE national Liberty Loan Bureau has approved a plan, which appeals to us as an excellent one, for stimulating the "win-the-war" spirit of employees of utilities and industrial concerns. Primarily it consists in the holding of win-the-war meetings prior to the opening of the Fourth Liberty Loan campaign, with programs designed to impress upon employees the urgency of bending every effort to put the country upon an actual war basis. While the success of the Fourth Liberty Loan is the goal immediately in sight, this is only an incident in the race for the ultimate goal—Victory! The details of this plan are announced by the Liberty Loan Committee in a statement in the advertising pages of the issue. Any company which wishes to take advantage of the offer by the committee of the booklet mentioned has only to fill in the coupon on the page and mail it to us. Electric railways and manufacturers of electric railway supplies have in this movement an excellent opportunity to join with patriotic employers in other industries everywhere in "putting over" the coming big loan.

Solid Manganese Versus Manganese-Insert Special Work

IN ANOTHER part of this issue we publish a short article by W. L. Whitlock relative to the comparative performance of the solid manganese and the manganese-insert types of construction as found in the same special work layout at given locations in Denver where the traffic conditions were similar. It will be noted that in the situation quoted the comparison seems to be unfavorable to the insert type. Nevertheless, we would not condemn the insert type of special work as a result of this performance, because it appears from a careful reading of the article that the insert type under consideration is that wherein the insert is set upon the ordinary or old-style spelter bed, presumably without any attempt at either partial or complete machined bearing. For this reason we should expect that the solid manganese type would give the better service under the same traffic, provided that there was good fortune in obtaining the solid pieces substantially free from hidden defects at the intersections.

It seems to us that the article in question tends to strengthen and confirm the opinion expressed in an editorial in the issue of this paper for Sept. 19, 1914, to the effect that bolted-down or keyed-down inserts on partially or completely machined bearings are believed to be necessary to meet present-day heavy traffic conditions, and it is our understanding that the manufacturers are now providing the machined bed in most of their orders unless definitely instructed to the contrary. Furthermore, the specifications of the American Electric Railway Engineering Association now call for partially or fully machined bearing for the iron-bound, hard-center insert type of special work construction.

Expenses Await No Laws—Revenues Should Be Increased Now

HOW strikingly illustrative of the tendency of the times is the fact that a petition for a higher rate of fare was presented at the same session of the Chicago City Council at which a service-at-cost ordinance was approved. This ordinance, reviewed previously in these columns, provides for a basic 5-cent fare and gives authority to the board of trustees to charge for transfers or raise the fare if necessary to meet the cost of service. The ordinance is not expected to go into effect for at least a year. Were it now effective there would be no question about the method of solving the problem raised by the recent awards of the War Labor Board. Unfortunately, however, that relief cannot come too quickly if the Chicago surface and elevated companies are to be saved from financial disaster.

When the aldermen of a city approve a service-at-cost measure in the public behalf, it would seem a logical sequence that financial relief be given to the company if necessary pending a public vote on the ordinance. If there is equity in a franchise based on service at cost, prompt and fair judgment should be given to the appeal of the Chicago Surface Lines for city co-operation in securing higher fares. Similarly, the State Utility Commission should be influenced by the ordinance vote of the aldermen when considering the petition of the elevated lines, which is referred to on another page of this issue. A fair-minded public will expect to pay for service when the cost is high, just as it expects to get the benefits of low fares when costs have been reduced.

Can the Local Public Always Be Trusted?

WILL the car riders of Buffalo insist on having their pound of flesh? Their intention to do so might fairly be presumed from the recent action of the people of that city in voting against the City Council resolution which would have authorized the Public Service Commission to fix higher street car fares. Thus complete failure marks the end of the first attempt to cross the barrier raised by Rochester decision of the Court of Appeals. This decision, it will be recalled, denied that the regulatory law had conferred upon the commission any power to alter franchise rates without municipal consent.

At the time of the decision we made the comment that New York had been turned back to the Stone Age of regulation. The result of the referendum in Buffalo has confirmed this opinion. The people of that city, having made a 5-cent fare bargain with the local company years ago, are evidently determined to insist that the agreement be carried out even though an essential utility be forced into bankruptcy. The people had the right to make this choice under the court's interpretation of the Buffalo charter. Time will prove, however, that they have used their worst judgment in their own interest.

The electric railway companies in Buffalo and other New York municipalities, however, cannot subsist merely on the educative influence of time—they must have money now. Unless many companies secure relief at once from their franchise obligations as to rates of fare, bankruptcy is inevitable. Surely there must be a way out of this crisis. If the authorities feel that the companies' interests must be safeguarded, they should disregard the senseless opposition of short-sighted agitators and have the commission law amended so that justice can be done. Action is needed, and at once.

Mail Carriers Should Pay Their Cost of Transportation

DISCUSSION of the terms of a new traction ordinance in Chicago recently brought out the fact that the United States government is paying only about $25,000 for the transportation of postal employees in that city, whereas the actual cost at the regular rate of 5 cents a ride would come approximately to $145,000. The mail carriers were trying to persuade the aldermen that the old arrangement should continue. Under the 1907 franchise this compensation was satisfactory for a while because it covered practically the number of men whose routes were a considerable distance from the mail stations. This time, however, the aldermen had under consideration a different kind of ordinance—one in which the people would pay the actual cost of service. The aldermen were now bargaining for their constituents, and they did not want the cost of service burdened with an item which they thought should be carried by the federal government. They left the appeal of the mail carriers for adjustment by a subsequent City Council.

Aside from any interest in the charges which the car riders of Chicago may be asked to carry, the equity of this situation would appear to call for action by the Post Office Department. It may be true that the mail carriers can ill afford to pay for the numerous rides they must make on their daily rounds in the public service. In most cities the Post Office Department provides them with tickets for transportation. The Postmaster General may be anxious to keep down operating costs in his department, but this should not be done at the expense either of the mail carrier or of the passenger who is paying for the entire service. Our government has a heavy burden to carry these days, but this does not justify the evasion of any positive responsibility. Let the Post Office Department pay for its cost of service, and let the car rider pay for his share.

Developing an "Industry Consciousness" Among Electric Railways

THE most important point made at the recent New York conference of electric railway executives, held under the auspices of the Electric Railway War Board, was that electric railways must for their own preservation give up their purely local characters and demand recognition as a national institution. This is absolutely essential if the nation is to be brought to a realization of what this great utility has been and now is, in the national life. It is essential also if the public is to be convinced that the electric railway business is actually at this minute in a critical condition. For the latter purpose, as several speakers at the conference said with semi-ironical humor, it may be necessary for one or more "sacrificial offerings" to be made.

One of the principal stumbling-blocks in the path of the railways is the belief of the public that the utility is not in as serious a condition as it claims.

In an editorial last week entitled "Federal Government Increasingly Powerful in Electric Railway Affairs" we pointed out a number of ways in which war conditions had forced electric railways to come within the national purview. In order that the federal government may have something tangible with which to deal, it is obviously necessary that there be recognized such an entity as the electric railway industry. This was what speakers at the New York conference meant when they urged the development of an "industry consciousness."

The practical question in all of this discussion is how an industry consciousness is to be developed. It seems to us that the first step is to agree upon certain principles regarding which there can be no dispute; and the second step is to see that the public understands exactly how these principles work out when applied to the present and future conditions of the electric railway business.

The fundamentals as outlined by Britton I. Budd, in last week's issue of this paper, will be excellent to start with. First, it must be agreed that the utility is a partnership of employees, public and owners, working together to supply a vital economic necessity, good transportation. Second, the cost of this service will be determined by the market price of labor of the necessary quality, the market price of the necessary funds, and the service which the public desires. Third, the selling price of the commodity is determined by its cost.

Now it is self-evident that transportation cannot be sold for long at less than cost, and the temper of Americans is such that they are not asking for charity here or elsewhere. Let them, therefore, be convinced, from facts, that the transportation service which is prescribed for them by their public service commissions is being sold below cost and that the companies cannot continue it, and then justice will be done.

But entirely aside from justice to the property, a larger task just now is to keep the properties going; to maintain even present standards, let alone improving them. This requires increased income—to get it seems to mean for the moment federal aid. To secure this, in turn, involves a united front, in other words, an "industry consciousness."

Three Men Thought Necessary to Operate a Car!

HOW times do change! Looking back over our files, we find a report made in 1903 to the Merchants' Association of New York by its committee on engineering and sanitation. There is much of merit in this report on the passenger transportation service in New York City. The men who wrote it had the co-operation of practical transportation men in their study of the local problem. We find, however, a recommendation "that upon the congested lines, on all cars having a length of car body of 28 feet or over, two men in addition to the motorman should be employed, at least during the rush hours." The committee thought this would expedite the movement of cars, minimize accidents and, in general, add to the convenience of the traveling public.

Of course, this was before the day of the prepayment car, which adequately took care of the situation the committee intended to meet. The point in this recommendation which appeals to us now, however, is the thought that electric railways were ever considered financially able to sustain such a luxury as a third man on the platform. Here in 1918 we find the average company barely able to make a living. Economies have been adopted in every department, and there is a growing tendency to operate with one man rather than three per car. What a strange exhibit of extravagance would be offered by the management which should now attempt to put two conductors on the rear platform and then go to a public utility commission seeking a higher rate of fare! Truly we are justified in saying: "It can't be done."

Bringing Out and Developing Latent Talent

EVERY aggregation of individuals is the repository of some talent, much of which is latent or potential because there has not been the occasion for bringing it out and training it. The talents which many men possess and which are not required in the ordinary routine of their every-day work are often more characteristic of the men than the qualities which they exhibit from day to day.

In other words, it is possible that the real man may be manifest in the doing of things entirely outside the routine of the office, shop, track or power house. That this is so is illustrated in the company section notes which appear on our Association News pages from week to week. These show that the section members can entertain acceptably with music, recitations, boxing, etc. Moreover, they can write instructive and uplifting papers on subjects of railway and other interests. Further, they can conduct campaigns for patriotic loans, war gardens, food conservation, better public relations and many other worthy causes.

Obviously employees' organizations, such as the company sections, afford a splendid means for training along such lines. Success in this direction is twofold; first it is necessary to find out what the men are now able to do in the way of assisting, instructing or entertaining their fellows. In the second place, success consists in affording them the opportunity and means for developing their talent. This should be the dominant idea in planning programs and committee activities, as well as in the organization of the section as a whole. No section can possibly fail if behind it are a recognition of the principle outlined above and an intelligent plan for applying it.

Protecting Our Property from Fires in War Times

JUDGING from the large number of disastrous carhouse fires which have occurred within the past year, the matter of fire protection is a pertinent one. Undoubtedly war conditions tend to increase the ordinary fire hazard, and in some instances enemy agents may have had something to do with the fires, which, by crippling local transportation, hampered our war activities. As was pointed out, however, in a symposium on the subject at the last convention of the American Society of Mechanical Engineers, the essentials of the fire protection problem are the same now as in normal times, and the methods of combating the fire hazard developed in times of peace are still the most efficacious. In this connection United States Attorney General Thomas W. Gregory is quoted as saying: "Statistics show as the chief dangers menacing private manufacturing plants those which originate or are developed within their own boundaries. The real protection needed is protection within the plant itself, and the prime responsibility for the internal protection of workshops and factories rests, as it always has rested before, upon owners and managers."

In all probability these remarks apply to the electric railway industry quite as well as to the manufacturing industries concerning which they were made. Oils, paints, oily waste, wood and the other inflammable materials used in car construction are found in electric railway shops and carhouses. These, taken together with grounded circuits, form a not altogether happy combination from the standpoint of the fire hazard. It may well be that the large labor turnover and the lack of trained employees also had something to do with last year's fire losses.

But how can the fire evil be combated? The insurance rates may be regarded as the truest measure of fire danger, and a study of such rates leads to the conclusion that those buildings which have automatic sprinklers and other auxiliary protection are about as safe from the ordinary fire as it is humanly possible to make them. Where fires have occurred in sprinkler protected buildings disastrous results have occurred only where the sprinkler system has been inoperative because of shutting off or inadequacy of the water supply due to defects in the equipment, or to the presence of a number of unsprinklered sections.

But fire-fighting equipment provides at best only a "remedial" type of protection. It seems logical to put at least as much stress on "preventive" protection. Such "protection means the segregation and isolation of all" inflammables and explosives, scrupulously clean premises and adequate supervision. There is much that can be done in a construction way, even with old buildings. What is everybody's business is usually nobody's business, and the entire matter of fire hazard and fire protection must be handled in a businesslike manner by officials vested with sufficient authority to get decisive results.

High Passenger Density the Outstanding Feature of New Service to Hog Island

The Philadelphia Rapid Transit Uses Train-Operated Surface Cars of Large Standing Capacity to Carry the Shipbuilders—The Heavy Rush-Hour Traffic Imposes Severe Service Requirements Upon the Rolling Stock—New Features Are Incorporated in the Door Control and Interlocking System

GOING AFTER THE HOG ISLANDERS

THE heavy passenger traffic suddenly thrown on one corner, as it were, of Philadelphia's transportation system by the development of Uncle Sam's big shipyard at Hog Island, necessitated a considerable increase in the available equipment of the Philadelphia Rapid Transit Company. As was noted in the news columns of the ELECTRIC RAILWAY JOURNAL for March 16, 1918, 100 new cars were purchased from the J. G. Brill Company, specifically to take care of the service to this shipyard. The funds necessary to cover the cost of these cars were provided by the Emergency Fleet Corporation under an agreement the general terms of which were published in the ELECTRIC RAILWAY JOURNAL for Aug. 3, page 186.

The transportation of the 30,000 shipbuilders to and from the scene of their daily labors is, of course, rush-hour traffic of the most severe type. This and the isolated location of the shipyard, taken together, result in a very high passenger density per mile of track. The passenger interchange movement is practically always unidirectional. In the morning the load is gathered up in the housing districts and at the transfer points, and as the cars are used exclusively in the shipyard service, few stops are made to discharge passengers until the Hog Island terminal is reached. In the evening the traffic flow is, of course, just the reverse, that is, the cars are loaded to capacity at the shipyard and discharge their loads in small groups at the transfer points while passing through the housing districts.

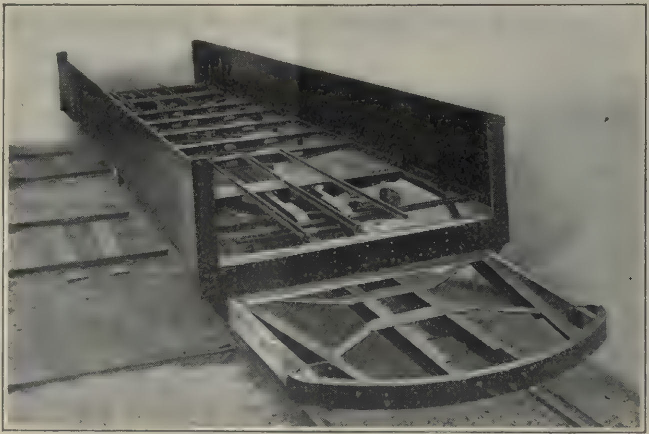


FIG. 1—UNDERFRAMING DETAILS OF THE HOG ISLAND CARS

The cars purchased to take care of this service were selected with particular reference to their ability to load large groups of passengers quickly and safely and to provide ample standing room. Their principal dimensions and other features are given in the table on page 408.

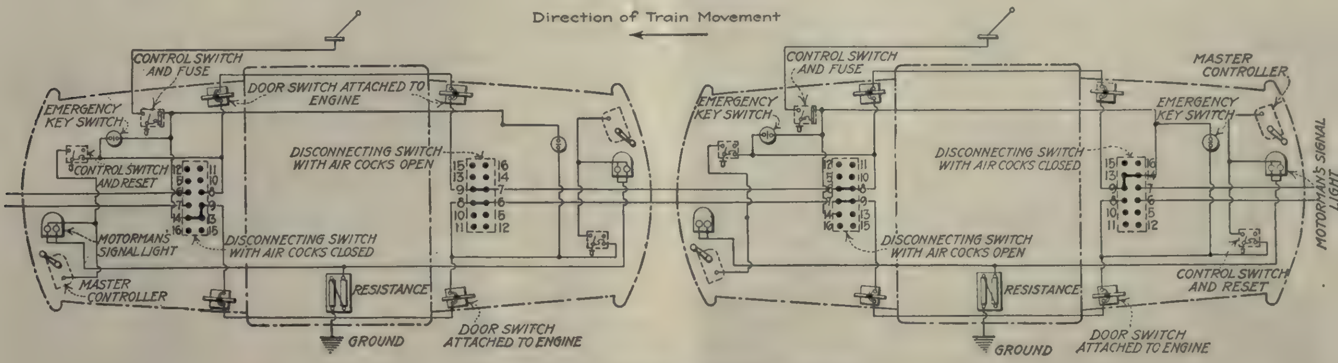
SEMI-STEEL BODY CONSTRUCTION IS USED

The framing is of the straight-sided type, the sheathing being made up of steel sheets $\frac{3}{32}$ in. thick, securely bolted to the posts, and riveted to the angle sills at the bottom and to the belt rail, 3 in. x ½ in. in cross-section, at the top. The top plates into which the side posts are mortised are of yellow pine. The letter panels are of poplar, securely glued together before machining, and held in position with flattened iron screws. Angle bars 5 in. x 3½ in. x $\frac{5}{16}$ in. in size are used for side sills, and at the bolsters the sills are reinforced with angle bars of the same size. The end sills are of $\frac{3}{16}$-in. plate bent to Z-shape, and they are securely attached to the side sills by means of gussets. The bolsters are of cast steel bolted to the side sills and provided with suitable openings for the brake rod and cable conduit. The bumpers are of 6-in., 13-lb. channels, and each end of the car is equipped with a Rico anti-climber extending the full width of the bumper. The details of the underframing are well shown in Fig. 1.

In order to provide for low step heights, the flooring at each end of the car body, starting at a point about 5½ in. back of the bolster, is laid with a ramp so that it is 2 in. lower at the vestibule door than elsewhere in the car. The flooring between the aisle and the sides of the car is in two layers, laid lengthwise with building felt between. The top layer is of ⅝-in. hard maple and the bottom of 13/16-in. yellow pine. Floor mat strips extend the full width of the aisle and are of hard maple spaced about ⅝ in. apart at the bottom and secured to the floor with countersunk iron wood screws. The roof is of the plain arched type, extending the full length of the body and supported by a continuous steel carline at each post. The carlines are forged into a single piece the shape of the roof from ⅜-in. x 1½-in. steel. The hoods are detachable and have wood carlines. The roof covering is of No. 8 cotton duck. One trolley board of yellow pine extends the full length of the body.

Special Provision Is Made for Train Operation

Each end of the car is provided with a round-end vestibule having three window openings in the front. The inside paneling of the vestibules is reinforced at the top with ⅜-in. x 3-in. iron braces, to which are bolted the brackets for the controller, engineer's valve, brake shaft, and other apparatus. Bulkheads without doors are provided at each end of the car. Each side of each platform is provided with doors, four in all, hinged in pairs to fold outwardly. The lower portions of the doors are paneled with cherry and the upper portions glazed with double-strength glass. The doors are equipped with National Pneumatic door-operating mechanism, and are so arranged that when the cars are operated in trains the conductor on the rear platform of one car can open the door on the front platform of the trailing car.


Direction of Train Movement
CONTROL SWITCH AND FUSE
DOOR SWITCH ATTACHED TO ENGINE
EMERGENCY KEY SWITCH
DISCONNECTING SWITCH WITH AIR COCKS OPEN
CONTROL SWITCH AND RESET
MOTORMAN'S SIGNAL LIGHT
DISCONNECTING SWITCH WITH AIR COCKS CLOSED
MASTER CONTROLLER
RESISTANCE
GROUND
DOOR SWITCH ATTACHED TO ENGINE
CONTROL SWITCH AND FUSE
MASTER CONTROLLER
EMERGENCY KEY SWITCH
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DISCONNECTING SWITCH WITH AIR COCKS OPEN
CONTROL SWITCH AND RESET
RESISTANCE
GROUND
DOOR SWITCH ATTACHED TO ENGINE

FIG. 2—DOOR AND CONTROL INTERLOCKING CIRCUITS

In order to secure this operating feature and to render the interlocking between the doors and motor control system more nearly "foolproof" a number of innovations have been introduced in the interlocking and door-operating apparatus.

A sketch of the interlocking circuits is given in Fig. 2. The apparatus consists of the usual door switches in series with the energizing circuit of the master controller and some additional contacts and lines in the disconnecting switch and circuits of the Tomlinson automatic air and electric couplers. The fundamental purpose of this disconnecting switch is to de-energize the motor-control circuit contacts on a coupler when it is not connected to the coupler of another car. The switch is of the drum type and is interlocked with the cocks in the airbrake lines so that the act of operating them also operates the switch. It is located back of the coupler under the end of the car body. The shaft of the drum is connected by means of bell cranks and a

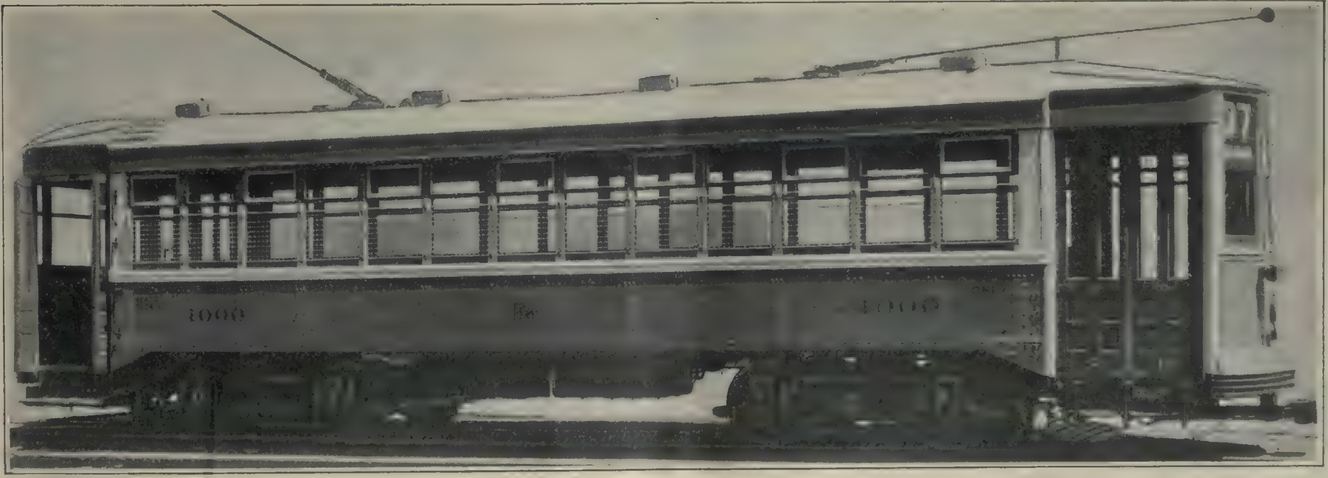


FIG. 3—GENERAL VIEW ILLUSTRATING MAIN STRUCTURAL FEATURES OF HOG ISLAND CARS

connecting link to a horizontal rod or shaft which ends under the car sills. The end of this rod is squared off so that the handle of the master controller can be used to operate the switch and air-cock combination.

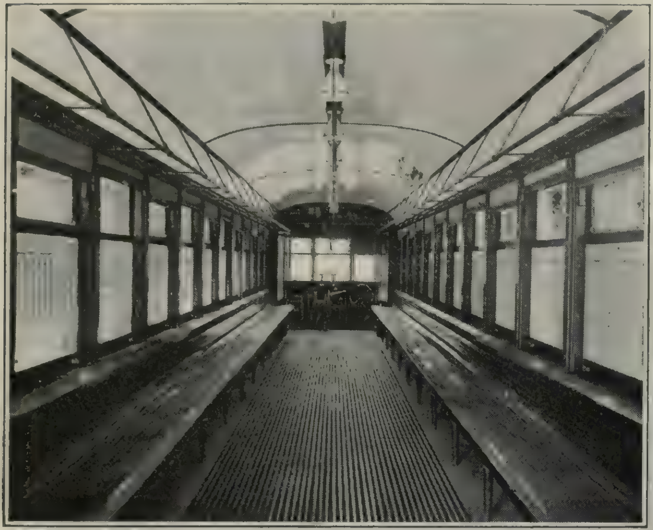


FIG. 4—INTERIOR VIEW SHOWING SEATING ARRANGEMENTS AND OTHER INTERIOR DETAILS

The operation of the interlocking circuits can be understood best by actually tracing the circuit through. With a two-car train the coupler disconnect switch contacts will be connected as shown in Fig. 2. From the trolley on the trailing car the circuit can be traced to the control switch and fuse, to contacts 14, 13 and 9 on the rear disconnect switch of the trailer, to the right-hand door switches of the trailing car through the couplers and right-hand door switches of the leading car to the control and reset switch and thence to the master controller and through the control circuits to ground. With any one of the four sets of doors on the right-hand side of the train open, the train cannot be started since the control circuit would be open at the open door. The doors of the left-hand side of the train are not involved in this circuit since, as will be seen later, they are automatically locked with the direction of train movement indicated in the sketch.

In the circuit traced, energy was considered as coming from the trailing car. As a matter of fact, the cars are actually operated with only the leading trolley pole in working position. They are connected with a train-bus jumper, however, so that the circuits are the same as those traced out except that the energy comes from the train bus instead of the trolley on the trailing car.

For single-car operation the coupler disconnect switches are in the positions marked "Disconnecting switch with air cocks closed." The interlocking with the air cocks, of course, eliminates the possibility of moving the cars with the disconnect switch in the wrong position. The innovation in the interlocking circuit is that with the arrangement described the operation is entirely automatic and a crew, in making up a train, perform only the operations necessary with any airbrake equipment. In case of failure of any of the door switches, a car can be operated back to the carhouse by closing the emergency switch which short circuits the door switches. This switch is located on the vestibule side of the end of the car body near the ceiling. Its position near the heater switches is shown in Fig. 7. It can be operated only by means of a special key.

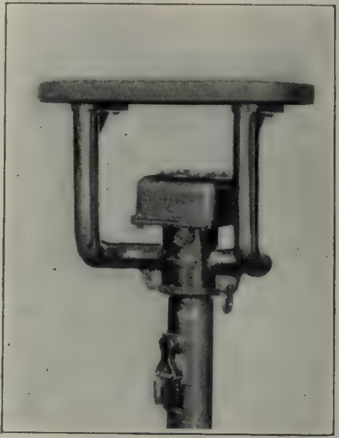


FIG. 6—DETAILS OF CONDUCTORS CONTROL STAND

As will be seen in the figure, lamp signals are used to give the starting signal. They are located on the dashes just to the left of the air gage, Fig. 4. To provide against the hazard of a lamp failure two lamps, connected in parallel, are used. The resistance in series with these lamps is such as to give a lamp voltage of 110.

MANY NEW FEATURES IN THE DOOR CONTROL

The requirements of double-end train operation, of the operation of the front door of the trailing car from the conductor's position in the leading car, the locking of all doors except those on the operated side and the locking-out of all door-control stands except those at which members of the train crew are stationed involved a number of interesting and complicated problems. The solutions of these problems are shown in the sketch in Fig. 5. Two push buttons, one marked "open," the other "close," are located at each motorman's position and four, as shown in the diagram, at each conductor's position. The motorman's buttons are

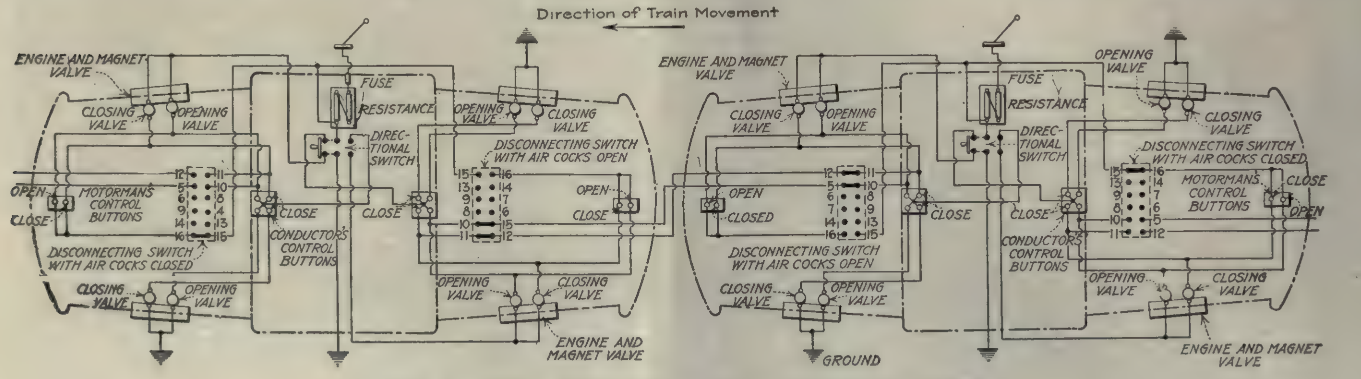


FIG. 5—DOOR OPERATING AND LOCKING CIRCUITS

mounted at the top of the dash between the master controller and the brake valve and those for the conductor at the top of the conductor's control pedestal under the wooden change tray which is provided on these cars. The button housing appears as a cap on the pedestal in Fig. 4 and is shown in greater detail in Fig. 6.

The door engines employed are of the usual type but their operation from another car has necessitated other contacts in the coupler disconnect switch in addition to those employed by the door interlocking circuits already described. A directional switch, which is mounted in one of the vestibules just above the door engine, Fig. 7, is also required. This is a double-pole, double-throw switch so connected that the handle must always be thrown in the direction of train operation or the doors can not be opened from the control positions. The operating circuit is connected to the trolley through a resistance which reduces the electric pressure to about 32 volts. It is entirely independent of the door and motor-control interlocking circuit.

How the Doors Are Operated

To illustrate the operation of the system, the circuit can be traced from the resistance to points 15 and 16 on the coupler disconnect switch, and thence to the motorman's buttons and the door-engine magnet coils to ground. By means of a circuit through the directional switch, the conductor at the rear of the leading car can operate both the doors at his side and, through a circuit in the coupler, the doors in the front end of the trailing cars. All of the buttons, except the three groups at which crew members are stationed, are locked out by being placed on dead circuits. It will also be noted that the left-hand doors are all inoperative because with the directional switch thrown as indicated their operating coils can not be energized. For operation in the reverse direction, it is of course necessary to throw the switches in the corresponding direction. To provide for the emergency of opening the doors with no power available, a small lever attached to the magnet valve of the opening cylinder projects from the closet in which the engines are housed. Pulling on this lever will admit air to the cylinder and thus open the doors. The engines are mounted on a steel plate which also holds the bearing of the doorshaft, thus maintaining a fixed relation between the engine pistons and the door shaft.

The engines are lubricated with a sort of splash system in which the central chamber between the two pistons is filled approximately half full of lubricant. Provision is made for reclaiming the lubricant emitted in the exhaust and returning it to the central chamber. With this system the engines can be operated in ordinary service for about two years without relubrication.

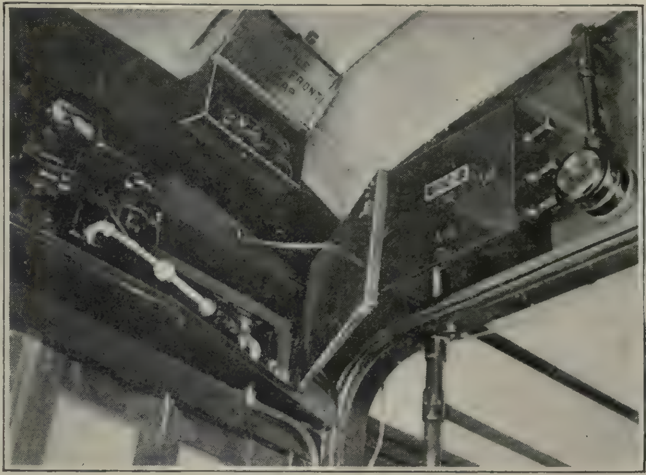


FIG. 7—VIEW OF VESTIBULE HOOD SHOWING DOOR CONTROL SWITCHES

FIG. 8—WOODLAND AVENUE AND FORTY-NINTH STREET—A HEAVY TRANSFER POINT ON THE HOG ISLAND LINE

Four-Motor Equipment Was Chosen

The motive power consists of four General Electri 247-C motors with type-PC multiple-unit control. Eac car has two Ohio Brass type-Z headlights and the necessary circuit arrangements to permit the application o a portable headlight. Interior illumination is secure from ten 23-watt Mazda lamps spaced along the cente of the car ceiling, and one light on each platform Safety car-lighting fixtures with heavy density opa reflectors constitute the accessory equipment. Each ca is also equipped with Nichols-Lintern automatic tai lights, of which a complete description was publishe in the Electric Railway Journal for Aug. 3, 191 page 203. These lights permit the safe and economica operation of the cars on the necessarily congested tracks.

Brill 77-E-1 trucks carry the car bodies. These trucks have a 5-ft. 9-in. wheelbase and are equipped with 33-in. rolled steel wheels. The wheels are mounted on Valley steel, heat-treated, standard E-5 axles. The trucks are provided with standard Brill center bearings, Perry side bearings, Anderson slack adjusters, Brill cast-steel bolsters, the Brill graduated spring arrangement, the Brill bolster guide arrangement, and Brill semi-steel journal boxes.

INTERIOR ARRANGEMENT PROVIDES AMPLE STANDING ROOM

As illustrated, the cars are equipped with longitudinal seats of the wooden slat type. This arrangement gives a seating capacity of fifty-two persons and provides for large standing capacity. As many as 200 passengers have been carried per car during the rush-hour periods. A motorman's folding seat of the Keystone type, arranged to fold against the inside vestibule lining, is installed in each end of the car. A Philadelphia Rapid Transit Company's standard conductor's seat is attached to the conductor's control stand.

The car interior is of cherry, stained and finished dull. All moldings are of plain design so as not to catch dust. The ceiling is of Nevasplit, painted white, and is held in place by a suitable molding which is secured with bronze oval-head brass screws. Moldings for advertising cards run the full length of the side decks. Twenty-six pushbuttons are provided for the convenience of the passengers in signaling stops, Consolidated equipment of the high-voltage type being used for the purpose.

General Electric emergency straight-air brakes arranged for train operation, and National staffless hand brakes constitute the braking equipment. A summary of other accessory equipment was published in the issue of the ELECTRIC RAILWAY JOURNAL for March 16, page 552.

The new cars are about 12,000 lb. heavier than the large, nearside, pay-as-you-enter cars now in service on a number of the surface lines of the company. Another point of difference is that the older cars are equipped with maximum-traction trucks and consequently carry only two motors.

DATA OF P. R. T. HOG ISLAND SHIPYARD CARS

Length of car body over anti-climbers	45 ft. 6 in.
Length of car body over corner posts	33 ft.
Width of car body over sills and posts	8 ft. 4 in.
Extreme width of car body, maximum limit	8 ft. 6 in.
Height from rail over trolley board	11 ft. 8 in.
Truck centers	21 ft.
Height from rail to top of first step	14 15/16 in.
Height from top of step to platform floor	13½ in.
Height from platform floor to car floor	10½ in.
Radius of shortest curve that can be rounded	35 ft.
Total weight, empty	44,000 lb.

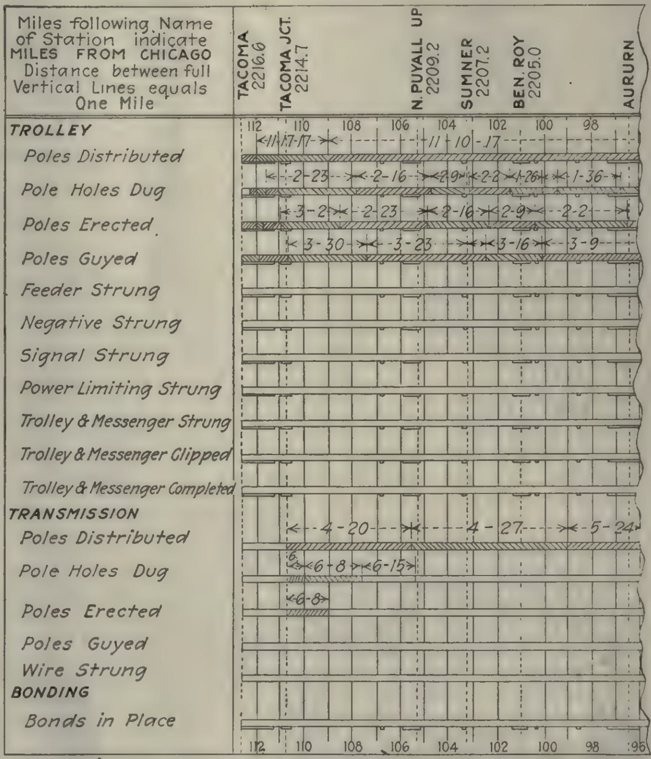
The War Industries Board, through its employment management division, has arranged courses of instruction in employment management at a number of educational institutions. The only cost is that incident to living expenses and about $15 for text-books and supplies. The idea is to train those who have to do with the "hiring and firing" of men so that the best results can be obtained with the available labor supply.

Progress of St. Paul Electrification Out of Seattle

All Buildings Have Been Erected Except at One Station—One 113-Mile Section Is Complete with Poles and Fixtures

DESPITE the nation-wide handicap of labor shortage, the electrification of the Seattle-Tacoma division of the Chicago, Milwaukee & St. Paul Electric Railway is making good progress. All of the substation buildings are up except Renton, which has just been started; and even some transformers are reported by the Westinghouse Electric & Manufacturing Company as ready for shipment. At each station three bungalows are built for the three shifts of operators.

Between Cle Elum and Tacoma, 113 miles, poles and fixtures are practically complete, and about one-third is done on the remaining section eastward for 98 miles to the Othello terminus of this division. The steel overhead structure for Renton is still to go up, while the unification of terminals at Tacoma is delaying work there until it is definitely determined what tracks shall or shall not be electrified. A sample chart used in checking progress on the work is given above.



PART OF PROGRESS CHART FOR LINE CONSTRUCTION ON THE ST. PAUL ELECTRIFICATION

Separate schedule progress charts are made covering signals, individual substations and the Tacoma-Cle Elum and Cle Elum Othello sections. The line progress report reproduced in part relates to the first 16 miles out of Tacoma. The small additional horizontal lines denote extra tracks as sidings and yards. The top of the complete line chart shows in addition to "crews" and "average number of men," the items of "work trains," "week ending" and "weather conditions." Operation of the Othello-Tacoma (Seattle) division is expected to begin in July, 1919.

Railways Facing a Crisis

The Public and Public Authorities Must Recognize the Seriousness of the Present Emergency

By W. W. HARRIS
Of Lee, Harris & Lee

TO THOSE who are willing to face the facts there can be no question that the electric railways face a crisis, and that the crisis is one apparently demanding federal legislation.

Notwithstanding the widespread efforts of electric railways to secure the permission of authorities to increase their fares, the general response has been neither immediate nor adequate. The opposition to increase of fares is still too wide-spread, and in many places too bitter to permit hope of a general settlement by local authorities. While Nero fiddles Rome burns. That this statement is not overdrawn is evidenced by the report just submitted to the government by J. A. Beeler. After investigation in the principal centers of war industry he asserts that electric railways the country over are running into bankruptcy and ultimate collapse. He declares it his belief that neither the government nor the communities realize the truth and urges the appointment of a federal administrator.

The President, the Secretary of the Treasury and other officials of our government have called the attention of local authorities throughout the nation to the imperative necessity of coming to the rescue of the embarrassed railways. While it is true about 250 companies have had various forms of increase in fare, there are still about 300 companies whose petitions remain to be acted upon, and more than 1000 companies whose business cannot help but have been seriously affected by war conditions. Possibly no other essential business has been so seriously affected by rising costs.

Nevertheless notwithstanding the appeal of the officials of the government, notwithstanding the appeals of the leading civic bodies in the large cities, certain interests—possibly to their political advantage, though in this I believe they are woefully mistaken—have opposed every move of the companies looking toward increased fares.

The government has announced that it is at present unable to exert its authority toward a definite settlement of this problem. This is why one is justified in saying that a crisis impends. Legislation by Congress looking toward federal action would meet this crisis. In New York or other states where public service commissions are without power to alter franchise rates, nothing less than speedy action by the legislatures—in special session if need be—will serve.

Not a Struggle for Profit

It does not seem to have been yet driven home into the consciousness of regulatory officials that higher fares are a war-time necessity and not a source of profit. Ex-President Taft and Frank P. Walsh, joint chairmen of the War Labor Board, in a report sent on Aug. 2 to President Wilson said:

> The increase in fare must be given because of the imminent pressure for money receipts now to keep the street railroads running so that they may meet the local and national demand for their service.
>
> Over-capitalization, corrupt methods, exorbitant dividends in the past are not relevant to the question of policy in the present exigency. In justice the public should pay an adequate war compensation for a service that cannot be rendered except for war prices.

At a meeting recently held in the City of New York about 150 men representing more than 500 railways discussed the general situation and especially the enormous wage awards of the National War Labor Board. Philip H. Gadsden for the War Board of the American Electric Railway Association made a statement in which he said:

> Statistics compiled by the Commissioner of Internal Revenue show that in 1916 the gross income of the electric railways of the country was $672,000,000 and that the net income was about $70,000,000. In 1917 the net had declined to $35,000,000, while the reports received from 154 companies, covering their operation for the first three months of 1918, showed a decline in net of 94½ per cent.
>
> This is for a period before the awards of the War Labor Board had become effective.
>
> The decision of the War Labor Board in the matter of wages will involve an addition of more than $100,000,000, and such an addition will wipe out every dollar of net income and leave only enough to meet about 50 per cent of the fixed charges, which in 1916 amounted to $160,000,000.

This is the situation in the United States. In the larger cities generally it is rendered even more acute by the persistent and mistaken—if not malicious—misrepresentation of the facts to the public.

Misrepresentation Hard to Overcome

The power of long years of misrepresentation of the affairs of the transportation companies cannot be quickly overcome, even by statements of the truth. Its effect has had notable examples within a short time.

Only a few days ago a referendum on an increased fare was taken in Buffalo. The members of the city government and some of the newspapers had for a long time opposed the company. It became perfectly apparent, however, that the company, without increase of fares, faced receivership, and the city government employed outside experts to make an examination. These experts reported that the increase in fares was a necessity. This report was endorsed by a representative of the National War Labor Board.

The City Government thereupon passed a resolution in favor of a temporary increase of fares, pending a permanent adjudication by the Public Service Commission. This finding, owing to a provision in the city charter, was then submitted to the referendum of the people. But the momentum of the long campaign of misrepresentation was too great, for although the Chamber of Commerce, the banks, the Central Labor body and all of the newspapers except one came out in favor of the temporarily increased fare, the voters rejected the proposition by an overwhelming balance.

What is the result? The city government of Buffalo has exhausted its power. The Public Service Commission has exhausted its power. The federal government says, that—notwithstanding the enormous war work going on in Buffalo—with 65,000 war workers of its 100,000 dependent upon the street cars—it has no power. The company itself is helpless. It cannot pay higher wages. Its men are quitting. If they strike, the Mayor says he will urge receivership.

Clearly the answer is immediate federal legislation or a special session of the New York Legislature. And in any case the time demanded for these is such that Buffalo must suffer in its service in the interim. This loss will cost far more than the added fare would have cost, and in the end the fare must be higher anyway.

THE PROBLEM IS COUNTRY-WIDE

Similar results were recently attained in a referendum in Birmingham, Ala. Still another demonstration of the persistent force of a long period of misrepresentation is afforded by the situation in New Jersey. In that State the Public Service Railway, operating in 145 towns, demonstrated its absolute need for increased revenue. But a heated political campaign is in progress in that State, and it has been reflected in the decision of the regulatory board by which an increase in the cash fare was refused but 1 cent was allowed to be charged for transfers, under the express provision, however, that the company should submit a zone system plan to the board by Jan. 1, 1919. The company has now, owing to new increases of expense, been forced to renew the petition for increase in fare. But the same public feeling exists. Whatever be the reason, the affected cities of New Jersey will not accept the company's statement of its condition.

Results such as have been attained in Buffalo, Birmingham and in New Jersey cannot all be due to a peculiar public. They would seem inevitably to indicate that the public had not been persistently and correctly told of the company's story over a long period. For eleventh hour publicity will not suffice. The surgeon cannot save the patient already showing *rigor mortis*.

In Massachusetts, although the companies had been under regulation for more than thirty years, so that there could by no possibility be an argument that the securities had been watered, and although they had not paid dividends, or at least none comparable to the returns made to capital in other industries, there was, owing to certain loud and sinister influences, a strong public feeling against the transportation companies. Ultimately legislation was passed by which a service-at-cost plan under state regulation made possible for any company desiring it. Under another act a state board of trustees was put in charge of the operation of the Boston Elevated Railway. It was then found necessary to institute a 7-cent fare at once. Furthermore, the actual operation of the 7-cent fare has shown that it will by no means meet the increased expenses caused by war conditions.

In Cleveland four raises in the street car fare have been made since last autumn, and now the rate is 5 cents cash fare and 1 cent extra for transfers. According to the reports of Fielder Sanders, Street Railway Commissioner of the city, the present fare will not be sufficient to meet the expenses of the road.

In Tacoma a 3-mile extension had been made to the municipally-owned road, and the city government had to determine the rate of fare. It was found that the cost of operation and of the extension had been so great under war conditions that not even a 7-cent fare would meet the bill. The fare was placed at 10 cents. The municipally owned roads in Canada have met similar experiences.

Plainly the old order is passing. Service costs more, and more must be paid for it. Plainly, too, the taxpayer must share the burden. In the words of William L. Ransom, counsel of the Public Service Commission for the First District of New York, the public must realize "that whether the form of ownership and operation be public or private the public can have in transportation or public utility service, only what it is willing to pay for, and there is no way of getting something for nothing for the public from a public utility over any considerable period of time.

THE TIME IS CRITICAL

It is quite apparent that the situation is really a crisis, for the campaigns against increase of fares are most bitter in the larger cities where most of the war work is being done. The integrity of our war program is seriously affected.

It is interesting to note the recent action taken in London, as described in detail elsewhere in this issue. After a long discussion the House of Commons decided that utility companies are entitled not only to their operating expenses—which the companies in this country are vainly seeking at the hands of the authorities—but that they are entitled to three-fourths of the average dividends paid before the war.

It should be noted here that the legislation in Massachusetts recognizes the right of the investor to a return upon his investment. This indeed is a feature of the service-at-cost plan wherever it has been put in operation. It is a feature of the Tayler ordinance in Cleveland. It is a hopeful sign. But service-at-cost legislation takes time. It cannot meet the present crisis.

The point I wish to emphasize is the necessity of the public and the public authorities recognizing that an emergency of the most critical character faces the service. Without a recognition of this fact the future of electric railways is full of peril not only to present investors but to business generally and to an essential part of our war program.

College Training in War Time

As a result of the passing of the man-power bill by Congress, and the consequent lowering of the draft age, all higher education of men in this country will be greatly affected. In fact, standard college courses are wiped out, and no college will operate this year except as a military training school. Men prepared for college will register as usual and will, as soon as arrangements are completed, be inducted into the army as privates, with private's pay and subsistence. Boys of twenty will stay in school three months; those of nineteen, six months, and those of eighteen one year.

New Single-Phase Locomotives for the Swiss Bundesbahn

The Author Describes Four Sample Locomotives Ordered for the Swiss Bundesbahn and Several Types Developed by the Oerlikon Company in Connection with This Electrification

By PROF. HUGO STUDER
Zurich, Switzerland

IN MAY, 1917, the management of the Swiss Bundesbahn ordered four sample locomotives for the Gotthard electrification. These have now been received and placed in service. It was the original intention to test these locomotives by operating them on the line between Scheraligen and Brig, but when the electrification of the line connecting Scheraligen and Bern was begun it was decided to use them, together with fourteen Loetschberg locomotives, to take care of the entire line between Bern and Brig, which is 72 miles long. The management of the Swiss Bundesbahn has now decided to order twenty more locomotives from three Swiss locomotive builders to be delivered the latter part of the year 1919 for service on the Gotthard line.

SAMPLE LOCOMOTIVES NOW IN SERVICE ON SWISS BUNDESBAHN

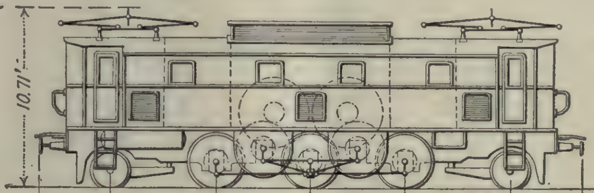


FIG. 1

Fig. 1—Small express locomotive type 1-C-1
Fig. 2—Large express locomotive type 1-BB-1
Fig. 3—Freight locomotive type CC.

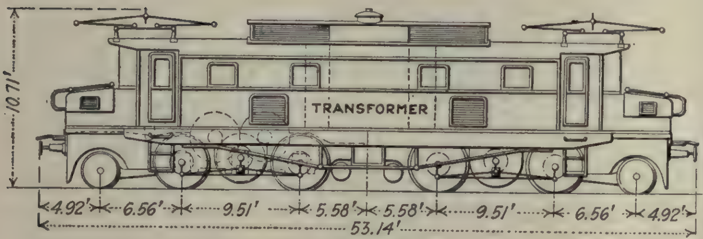


FIG. 2

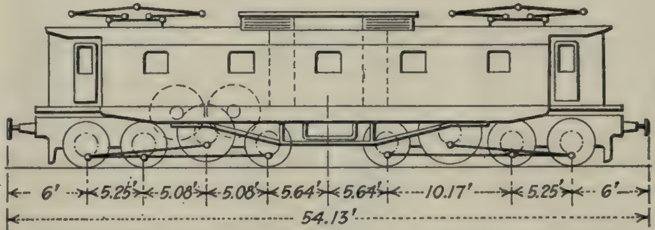


FIG. 3

The four test locomotives are of three types: One small express type, two large express types and one freight type. Under certain conditions these may be interchanged one for the other. The large express locomotives were intended for service between Lucern and Chiasso with a small express locomotive assisting on all grades of over 2.1 per cent. The maximum speed is 46.5 m.p.h. The service specified for the freight locomotive required making two round trips between Golden and Chiasso in twenty-four hours, with a trucking load of 950 tons (1,900,000 lb.), a second freight locomotive to be used to push on grades of more than 2.1 per cent. The permissible load on the driving axles is set at 39,600 lb. and on other axles 26,400 lb. minimum and 35,200 maximum. The maximum speed is 40.3 m.p.h.

The electrical equipment for the small express locomotive was built by the Oerlikon Company and the remaining parts by the Winterthur Locomotive & Machine Works. The type of construction is shown in Fig. 1. The locomotive being 44.28 ft. long, symmetrically constructed and similar in design to the large Loetschberg locomotives described in the ELECTRIC RAILWAY JOURNAL of Nov. 15, 1913, except that this locomotive has but three driving axles instead of the five used in the Loetschberg locomotives. Two single-phase series-type motors are provided, each having twelve poles and being rated at 125 hp. They are mounted on the middle of the locomotive frame, and the power is transmitted from them through spring-equipped gears to two jackshafts which transmit the power to the three driving axles by means of cranks and side rods. The electro-pneumatic reversing switches are mounted over the motors in a manner similar to the mounting in the large Loetschberg locomotives. Air-cooled transformers, together with the controllers, main switches, compressors, etc., are located at each end of the motors. The driver's cabs are located at the end. The normal drawbar pull for this locomotive is 19,580 lb. The normal speed is 31 m.p.h. and the maximum speed 46.5 m.p.h. The total weight including electrical equipment is approximately 100 tons.

LARGE EXPRESS LOCOMOTIVES ARE COUPLED TYPE

The electrical equipment for one of the large express locomotives was built by the Oerlikon Company and A. G. Brown, Boveri & Company supplied the equipment for the other. The mechanical parts were built by the Winterthur Locomotive & Machine Works. This locomotive, type 1-BB-1, is shown in Fig. 2. It weighs 116.6 tons and 53.14 ft. long. The construction is similar to the type 1-C-1 locomotive just described, except that two trucks are provided and coupled together. Each part has two ten-pole motors of 560 hp. each. The motors are carried in the frame and are coupled together by means of spring-equipped gears and a jackshaft. The cab extends nearly the entire length of the locomotive, and the oil transformer, together with the control apparatus, is located in the center of the locomotive. The auxiliary apparatus, such as compressor and converter, is built into the ends, thus setting the driver's cabs back slightly from the front. The normal drawbar pull of this locomotive is 26,400 lb., with a maximum drawbar pull of 39,600 lb. The normal speed is 31 m.p.h. and maximum speed 46.5 m.p.h.

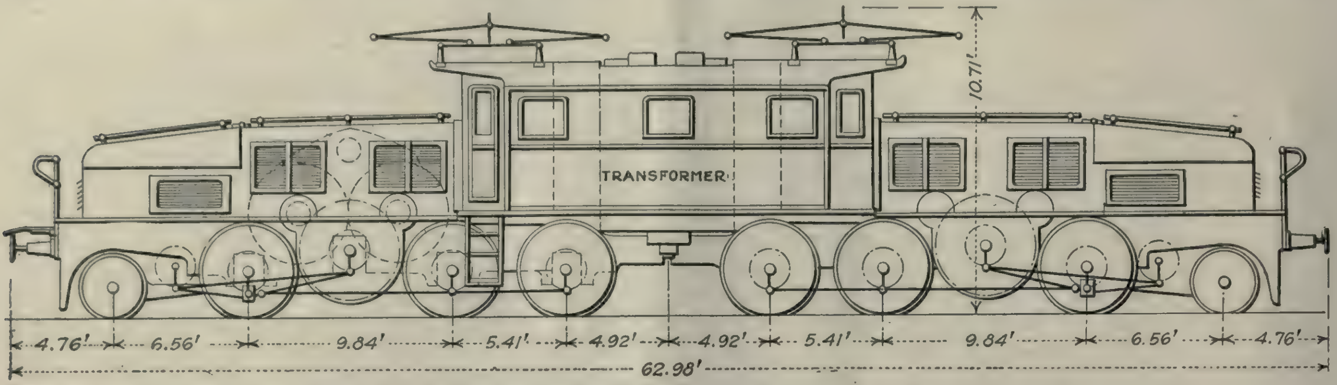


FIG. 4—NEW TYPE FREIGHT LOCOMOTIVE RECENTLY ORDERED FOR SERVICE ON THE GOTTHARD LINE

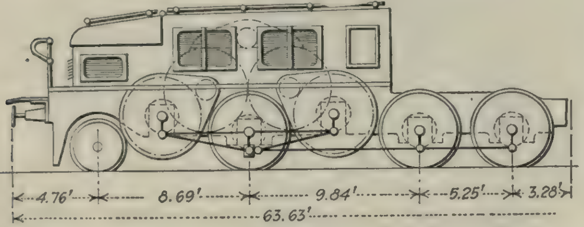


FIG. 5

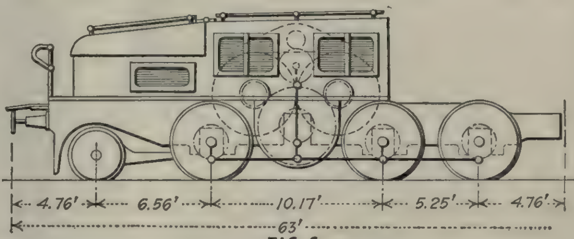


FIG. 6

FIG. 5—LOETSCHBERG LOCOMOTIVE EQUIPPED WITH A TRIANGLE ARRANGEMENT OF SIDE RODS. FIG. 6—LOCOMOTIVE EQUIPPED WITH VERTICAL SIDE RODS

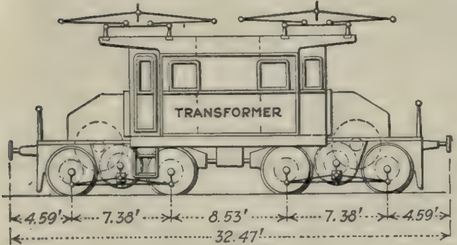


FIG. 7

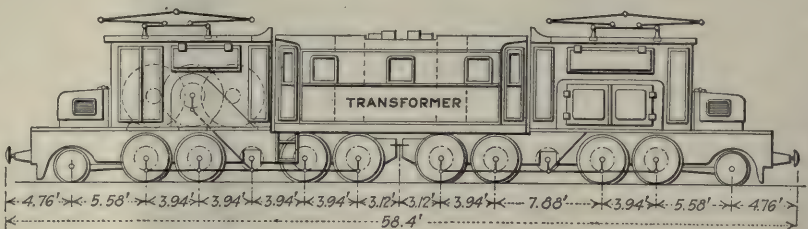


FIG. 8

FIG. 7—SMALL LOCOMOTIVE FOR LIGHT WORK ON BRANCH LINES. FIG. 8—LOCOMOTIVE WITH THREE PART CAB CONSTRUCTION ESPECIALLY ADAPTED TO NARROW GAUGE RAILROADS

The control equipment for both locomotives is electro-pneumatically operated with twenty-three steps, thus providing smooth acceleration and close adjustment for normal running. By interlocking the control connections the number of taps from the transformer is reduced. The use of a single transformer simplifies the electrical connections, but the body construction must be made heavier to carry the weight at one point.

As shown in Fig. 3 the freight locomotive is 54.13 ft. long. It was built by A. G. Brown, Boveri & Company and the Winterthur Locomotive Works. It has three axles and is of the coupled type. Each truck has two motors mounted between the second and third axles from the ends. These are coupled together by means of spring-equipped gears, and a jackshaft transmits the power to the wheels through side rods. The driving arrangement is similar to one of the first Loetschberg locomotives except that two motors are used for each part instead of one. The drawbar pull of this locomotive is approximately 35,200 lb., and the maximum 52,800 lb. The normal speed is 23.32 m.p.h. and the maximum speed 40.3 m.p.h. The weight is approximately 246,400 lb.

OERLIKON COMPANY'S NEW TYPE LOCOMOTIVES

The last order for twenty locomotives is to be made up of ten large express locomotives, as shown in Fig. 3, to be built by A. G. Brown, Boveri & Company and the Winterthur Locomotive Works, and ten freight locomotives of a new type developed by the Oerlikon Company and the Winterthur Locomotive Works, as shown in Fig. 4.

In designing the Loetschberg locomotives duplicate equipment was provided throughout so that the equipment could be operated in limited service with half of it disabled. This resulted in a comparatively long locomotive having a long wheelbase and being relatively heavy and expensive. This procedure was justified in the Loetschberg locomotives as they were more or less of an experiment, but practice has shown that the necessity for duplicating equipment does not exist. If only one transformer is to be used there is but one logical place to put it, and that is in the middle of the locomotive. This requires a heavy locomotive body since the main load is in the middle.

The development of such a type of locomotive by the Oerlikon Company has resulted in a machine with two trucks directly coupled together. The driving motors and other equipment are mounted on the outside of the central cab between the second and third axles. These parts in general are covered with low housings. Running boards are provided on either side of the housings for the use of the operators in getting into and out of the locomotives. The locomotive cab proper could thus be made very short, extending only one-third of the total length of the locomotive. The main circuit breaker and transformer are mounted in the middle of the cab with the control apparatus located on each side of the transformer so that the connections to the transformer are extremely short. The transformer and the cover of the main circuit breaker form a part of the cab roof, so that no special bushings or insulating devices are required to bring the high-tension leads inside the locomotive.

This arrangement has a further advantage in that the driver is not right at the front of the locomotive while operating. This gives him a feeling of safety which will tend to keep him at his post and in command of all safety devices when in danger, and the low construction at the ends insures non-interference with his view of the track ahead. This location also is near the control apparatus so that should multiple-unit operation fail for any reason a simple manual operation of the apparatus can be resorted to. A great advantage of this arrangement of apparatus is the facility provided for the removal of the motors and the relatively short and light central cab.

When the jackshaft cannot be located on the same level as the driving axles, various driving arrangements are possible. The lightest construction used is that of the first Loetschberg locomotive and in the CC test locomotive shown in Fig. 3, which is equipped with inclined side rods. The triangle arrangement shown in Fig. 5 was used on the large Loetschberg locomotives. Still another method of accomplishing the same purpose is shown in Fig. 6, where a vertical side rod is used.

On the recommendation of the Winterthur Locomotive Works an inclined side rod with auxiliary jackshaft was chosen for the ten freight locomotives being constructed. The gear ratio of these ten locomotives is 1 to 4. The normal rating of four motors is 2100 hp. at the driving wheels. The weight of the electrical equipment is 116,600 lb. and the mechanical parts 156,200 lb.

The locomotive shown in Fig. 7 is a smaller type having a rating of 660 hp. with from 13,200 lb. to 19,800 lb. drawbar pull and a maximum speed of 27.9 m.p.h. This locomotive is suitable for light work on branch lines, suburban traffic, etc.

Fig. 8 shows a three-part cab construction especially adapted to a narrow-gage railroad. In this case, on account of lack of room, the motors extend practically to the height of the roof and the front housings shut off some of the view of the engineer. However, he can see even better than on steam locomotives, due to the better arrangement of the equipment.

Houston Adopts Telephone Dispatching

How the Dispatchers in Texan City Control Car Movements and Receive Reports of Delays, Accidents and Defects

DURING the last week of May, the Houston (Tex.) Electric Company installed a telephone dispatching system with forty-two stations centering at the company's office. Among the results secured was the elimination of the hand-written check of car headways at Main and Congress Streets, one of the more important intersections.

During the course of the day three dispatchers handle the board under the direct control of the superintendent of transportation. He is the officer of the day responsible for all car movement. Road inspectors report directly to him for instructions.

Each of the three dispatchers has an eight-hour trick. The morning trick is 7 a.m. to 3 p.m.; the afternoon trick, from 3 p.m. to 11 p.m., and the night trick from 11 p.m. to 7 a.m. The night man checks cars into the carhouse, figures mileage, prepares the sheet for the following day, and books cars and crews for the following morning. The tricks are changed sufficiently to give one man a twelve-hour trick for two successive Sundays and then let him be off duty for a complete twenty-four hours.

As each starter sends out cars he gives the dispatcher the run number, the car number, the names of the crew and the leaving time. The crew telephones its car number to the dispatcher from each end of crosstown lines and from the suburban end of other lines. To get the dispatcher it is necessary only to take the receiver off the hook, the dispatcher answering by giving the time the car is due at the box If the car is off-time he will give the necessary instructions. If because of rerouting or some other change the regular boxes are not available, the men use others designated by the dispatcher. When a crew pulls into a carhouse, it reports to the dispatcher as at the end of the line.

If a car is off schedule because of delay, the crew reports to the dispatcher the cause and the duration of such delay. At present the crew continues to make out a written delay card as heretofore. This card is turned in to the belt inspector at Main and Congress Streets or the interurban office as soon as the crew passes either point.

To order an ambulance or otherwise arrange to care for some case of personal injury, the crews use the nearest outside telephone. Minor accidents are reported at the nearest private station as follows Line, car number, conductor, motorman, time, place name and address of person injured or owner of property damaged, and nature of accident.

The belt inspector at Main and Congress Streets and the agent at the interurban station have an emergency supply of transfers. Only the belt inspector has an emergency supply of half-fare tickets. No change-making facilities, however, are supplied.

News of track, line and car defects, when reported to the dispatcher, is immediately passed on to the proper authorities. Crews are instructed to report on defective cars from the end of the line, whenever possible, so that the dispatcher will have the opportunity to order a change of cars.

The dispatcher does not directly handle complaints and lost-article inquiries, but he refers the speaker to the number of another official who handles such matters.

Duluth Has Women Car and Shop Workers

Seventy-five Are Now Employed—Separate Restaurant and Carhouse Accommodations—Specifications for Uniform Are Published

IN ADDITION to thirteen women car cleaners the Duluth Street Railway now has seventy-five women conductors, the inevitable result of operation in a busy war-work community. Nothing could be more significant of the need than the fact that 90 per cent of the men who have left the company during the last year went to the shipyards and that forty men out of 300 left in the single month of June. At the end of the month the company was short fifty men.

The women conductors are employed at exactly the same rates as the men, namely, 10 cents an hour while learning and 32 cents an hour from the time they are on regular duty. Their runs do not differ materially from those of the men, the common practice being one-piece runs with a fall-back or layover for lunch. Many prefer night runs.

DINING ROOM FOR WOMEN; DORMITORIES AT BACK

These women average a high order of intelligence. About one-third are former waitresses who are skilled in handling people politely and accustomed to standing; some have come from factories; four or five are the wives of motormen but do not work on the same cars, and quite a large number are school teachers who have entered the service since the close of the school term. It is expected that many of the teachers, for whom this means a neat increase in earnings, will stick to the car instead of returning to the schoolroom.

For trial uniforms, the company adopted a loose blue coat and cap similar to that worn by the men. It also considered khaki and puttees as used by the New York Railways, but concluded that khaki was too light for the severe Duluth winters. It felt that whatever uniform was adopted should be natty and striking, for the public would expect something out of the ordinary when women became conductors. Therefore, neither the original baggy outlines, nor a suit that would have to be covered up in winter, would serve.

A CORNER OF THE WOMEN'S REST ROOM IN EMPLOYEES' QUARTERS

The uniform adopted later is of blue cloth, close-fitting tailor-made, with face and side pockets. The cap is higher and the visor is shorter than before to secure a less masculine appearance. The specifications for the uniform also declare that the shoes must be at least 9 in. high and that shoe and skirt must meet. The complete uniform costs $26 to $27 and may be paid for within sixty days.

A matron is in charge of all women employees. A handsome rest room has been fitted up for them at the Superior Street headquarters in Duluth. In addition, there are three rooms with cots for which a charge of 10 cents is made if used over-night for sleeping, with change of linen; otherwise, as in the case of the men's rooms, the cots have a covering on which naps may be taken without any charge. Like the men, also, each woman has a private metal locker. A cut in a division wall has been made to give them service from the restaurant which has been maintained for years by an outside caterer. The company furnishes quarters and electricity free. The women preferred this arrangement rather than to go into the men's restaurant. Provision has been made at several private places for toilets for women conductors where the company could not install them itself.

For the men there has long been provided a separate clubroom with shower baths, pool tables and other comforts. This includes a reading room with weekly and monthly periodicals paid for by the company.

Selling Transportation on a Commercial Basis

The Rules Do Not Vary Greatly from Those in Other Lines of Business — Public Must Know What It Is Purchasing in Order to Be Satisfied

By CLARENCE RENSHAW
General Engineer, Westinghouse Electric & Manufacturing Company

WHEN any commodity is sold by the pound, the yard, the dozen, etc., these units express the obligation of the seller and the rights of the buyer in a definite, quantitative way. The former in stating his price expresses his obligations toward his customer, while the latter, after hearing it, knows exactly what is coming to him for a given sum of money. What is perhaps of even more importance in such a transaction, the purchaser can readily assure himself that he has received full value, or that he is short by a concrete amount. In the latter case his complaint can be readily adjusted.

It is a comparatively easy matter for a merchant who deals with his customers on such a basis to be always on good terms with them. Conversely, it is essential that there should be some definite understanding of mutual obligations between seller and buyer, in order that such relations may prevail. One of the greatest weaknesses in the relations between the electric railways and the public has been that heretofore this fact has not been fully appreciated. The railways have made strenuous efforts to convince the people that the price of their product was too low, but seldom, if ever, has any company attempted to describe exactly what it was giving for the fare received. The people, on their part, have felt that the railway companies owed them good service, and in the absence of any definition as to what good service is, they have always claimed they were not getting it.

Everyone recognizes that in a store conditions must be right or the business cannot be profitable. The surroundings must be attractive and the clerks polite. The prospective customers must be told what goods are for sale and what the prices are. The goods must be of a quality commensurate with the price. The patrons must be made to feel that their trade is appreciated and that they receive fair value for their money. Unless these things are done, the people will go elsewhere to make their purchases. There are always other stores.

Sale Methods Apply to Electric Railways

Although it is not generally recognized, these principles hold equally well with regard to electric railways. True, the conditions are apparently different. A railway has a monopoly. The people must have transportation and the railway affords the only means by which they can obtain it economically. There is no recourse. The store (*i.e.*, the cars) may be dirty and out of repair. The clerks (*i.e.*, the motormen and conductors) may be impolite and unobliging. No effort may be made to tell the people what is for sale (*i.e.*, where the cars go and when), or what the price is (*i.e.*, fare, transfer privileges, etc.). The quality of the goods may be poor (*i.e.*, cars slow, infrequent and crowded). Since there is no competitor to patronize, however, the people must continue to ride anyway and must be pleased with whatever the railway gives them. So why spend money on "commercial methods" or why commit one's self to any definite "standard of service"?

Here is the reason. We were wrong on one point. The people may have to take what the railway gives them, but they do not have to be *pleased* with it. Moreover, when one's customers are not pleased, monopoly, or no monopoly, it is only a matter of time until the business fails. There is another reason. An old proverb says, "Give a dog a bad name and you might as well hang him." For the same reason it isn't necessary for a railway company actually to be derelict in any or all of the above respects for the public to fail to be pleased. Its car service may be the best in the world, but if the public thinks it is poor the result will be practically the same as if the car service actually is poor.

The adoption of commercial methods by a railway company would not necessarily mean that any change would be made in the quality of the car service. What it would mean is that the public would be informed as to the service which the company believed was due it and was trying to give it. If a person gives you short change and you are convinced that it was not intentional, you do not hold the incident against him. If you have reason to feel that he was deliberately trying to cheat you, however, his reputation is gone. So, when a person or a corporation boldly announces that it believes a certain course is right and then proceeds to follow that course, there is usually little criticism. Let us consider a typical case.

Difference Between Running Cars and Giving Service

In the absence of any information to the contrary, people usually expect to get a car within a few minutes of any time they get to the corner. If a man has to wait fifteen minutes, therefore, he naturally feels that the service is poor. If he knows, however, that the cars on that line are only supposed to run every twenty minutes, and if he also knows that he cannot expect one until such and such a definite time and if when the car comes he finds by his watch it is exactly on time, his attitude is then entirely different. Under these conditions instead of feeling, on account of his fifteen-minute wait, that the service is poor, he feels that it is good because the car is on time.

It is obvious, therefore, that two people waiting on the same corner for the same car may form exactly opposite ideas of the railway company. One, not knowing the basis on which the cars are supposed to operate and judging by an imaginary standard, may feel that the company is very lax. The other, knowing exactly what the company has obligated itself to do and finding that it is meeting this obligation to the letter, will feel that it is conscientious and business-like.

Nor is this example a mere hypothetical case. Several times in different cities, where I was studying the railway service and hence was provided with this information, I have been one of two such parties and I have heard the other party express himself. Moreover, the widely different opinions of the railway company which the two parties formulate in such cases are entirely justified, for although the *car* service given to each is exactly the same, the *service* (a much broader term) has been widely different. The one who knows when the car is due has been given good service; naturally he is pleased. The other, who has had no opportunity to learn this, has not been given the treatment to which I consider he is entitled. One manager told me that the people on his lines always found out from the crews what time the cars left. Fine!—but imagine a department store whose bargain sales were patronized only by the people who had learned the particulars by asking the clerks.

To my mind the above indicates the cause of the trouble from which most of our city railways are suffering. What they regard as their principal duty is to run cars, while what the people want is service. It is, of course, necessary to have cars and to run them, but in many cases I believe that comparatively little invested in the right kind of service would do more good with the public than many times the same sum devoted merely to increasing the number of cars.

SOME REQUISITES FOR GOOD SERVICE

One of the first requisites in selling transportation service is a suitable map of the system in the hands of each citizen. It is much easier to persuade a person to ride on the cars if he knows where they go than it is if he is always fearful of losing his way. Nor will any old map do. It must be sufficiently small for convenience and yet large enough to be clear and distinct and to allow one route to be distinguished from another. An enlarged view of the downtown district in the corner or on the back will often help solve the problem.

The map should be supplemented by a route sheet so that general locations obtained from the map can be followed in details as to streets, where desired. Both map and route sheet should describe the designation of the cars, so that one can easily find the car for any route or the route of any car.

Fares, reduced-rate tickets, transfer points, zone points, methods of fare collection, etc., should also be described. Anyone planning a trip on an unaccustomed line should be able to inform himself in advance as to all these points. Most people are more or less sensitive. They hate to show their ignorance of these matters by asking about them, especially as conductors are sometimes neither clear nor gracious in their replies. People especially hate to be penalized by paying single-fare rates when they might have purchased reduced-rate tickets, or by riding a block beyond a fare zone and having to pay a second fare, when they might have gotten out and walked. Night fares, if different, should also be covered with a clear statement of the hours during which they are in effect.

Time points, headways and running times are likewise important. One is a much better potential purchaser of transportation from the local railway of his city if he is properly informed on these subjects, because he is better prepared to use the commodity which the railway has to sell instead of employing an automobile or walking. I once knew of a salesman for a manufacturing company who hired an auto to call on the master mechanic of the railway company in a certain city, because of an exaggerated idea of the time required to get to the shops on the cars.

Finally, matters of policy should be dealt with. The number of cars operated on any given line at different times of the day is usually arranged so that in the rush hours no car need carry more than a certain maximum, and so that in non-rush hours the interval between cars will not be too great for reasonable convenience. These and other fundamental principles of railway operation are perfectly legitimate and straightforward, and if openly acknowledged in the right way would do much to prevent dissatisfaction.

"GOOD SERVICE" NEEDS DEFINITION

There are, of course, many other items which will suggest themselves, if the idea of doing business on a commercial basis and treating the people like customers is once established. The foregoing, however, should be sufficient for illustrative purposes. The point I wish to make is, that to my mind the fundamental reason why the public is so generally dissatisfied with the electric railways is not so much because of the car service which they give, as it is because of the usual lack of the broader service to which I have referred. The railways have always hesitated to define what they considered reasonable service or to formulate their obligations to the public in a definite way, for fear that some day this might embarrass them. The public, on the other hand, with no statement or standard to guide it, has always taken the stand that no matter what service the electric railway may be giving, it is not as good as it should be.

This, then, leads to the idea one hears expressed so frequently by the statement, "I wouldn't mind paying an increased fare if the railway company would only give the proper service." This statement is entirely honest and the railway companies should take advantage of it. In doing this, however, I believe they will surely find that while the speaker himself may not know it, the "proper service" for which he yearns consists not merely of more cars but of the application of the same commercial methods that are employed in selling other commodities.

Federal Registration of Engineers

The Division of Engineering, United States Employment Office, Department of Labor, has prepared a government classification form for engineers. The director of engineering, A. H. Krom, urges every engineer to fill in one of these forms, which can be secured from local United States Employment Service offices or from the office of the division, 29 South LaSalle Street, Chicago, Ill. With full information as to the resources of the country in the way of trained engineers, the division will be able to recommend qualified men for vacancies in the field.

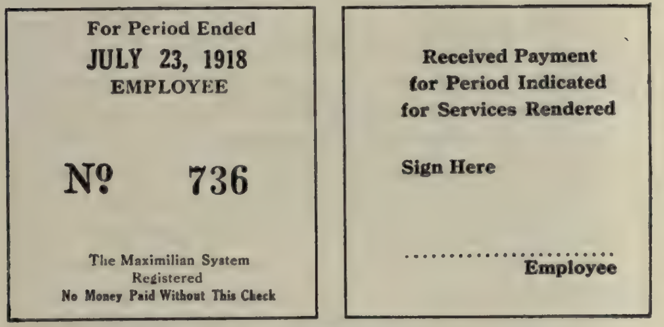
Employees' Pay Checks

Electric Railway Auditor Devises System for Financial Protection and Time-Saving

THE "Maximilian" system of pay checks for employees is said by the patentee, A. M. Lewis, auditor Elmira Water, Light & Railroad Company, Elmira, N. Y., to have distinct advantages over similar systems now in use. It prevents fraud, protects the employer, saves considerable time on the part of all concerned and acts as an identification of employees. The basis of the system is a 2-in. x 2-in. pay check, such as is shown in the accompanying illustration.

In the operation of the system, the timekeepers, the department heads or the superintendents place the names of employees on the payrolls in the proper numerical order, using the series numbers pertaining to the various departments. For instance, pay checks No. 1—300 might be for conductors and motormen, 301—400 for track employees, 401—450 for carhouse and shop employees, 451—500 for power-plant employees and so on.

The accounting department checks the payrolls and turns over pay checks corresponding to the numbers listed. When these checks are received by the superintendents or other officials, they are distributed to the men and presented by them at the paymaster's office. The number and the name signed by the employee on the pay check receipt must correspond with those on the payroll.



For Period Ended
JULY 23, 1918
EMPLOYEE

Nº 736

The Maximilian System
Registered
No Money Paid Without This Check

Received Payment
for Period Indicated
for Services Rendered

Sign Here

....
Employee

SPECIMEN OF EMPLOYEES' PAY CHECKS

The accounting department checks the payrolls with the pay checks three days after payment. This three-day period is allowed for stragglers or men temporarily away, and it reduces to a minimum the entries to the "Unclaimed Wages" account. For every number on the payroll for which there is no corresponding receipted pay check, the paymaster must produce the amount of money listed. It is obvious that the paymaster cannot withhold any money due to employees or convert any, even temporarily, to his own use.

The colors of the checks are changed weekly, so that the presentation of a check not having the current color indicates a claim upon the "Unclaimed Wages" account. If the check is properly listed therein, it is honored for payment. Lost pay checks must be reported to the accounting department, which will make a notation on the payroll affected and issue a duplicate check. The lost check, if later presented, is taken up by the paymaster and the general manager's attention drawn to the fact.

The employees are paid in cash, counted out in full sight by the paymaster. This procedure obviates the necessity of doing up the money in envelopes and avoids disputes over the correctness of the payment. It also eliminates the writing of bank checks and the balancing of bank accounts and outstanding checks. If there is any error in the amount due, the matter is referred to the accounting department for adjustment.

In Mr. Lewis' opinion, the system is particularly desirable by reason of its flexibility, as the series of numbers applying to any particular department can be increased or decreased at will according to the number of employees. The system will work out satisfactorily for hundreds or thousands of employees. The cost of printing, cutting and tying-up tickets by weeks is said to be nominal.

The system is at present used by the Elmira Water, Light & Railway Company, which employs approximately 750 people. It is also in use at the five factories of the Electric Hose & Rubber Company, Wilmington, Del.

Buses Abandoned in Havana

Operation of Electric Buses in Cuban Capital Not Profitable—Receipts for Ten-Month Period Show Deficit of $281

THE last report of the Havana Electric Railway, Light & Power Company gives an interesting account of the experiment made with electric omnibuses as auxiliaries by that company and their final abandonment after a trial of about ten months. The company has always operated a certain number of stage lines, but as the earnings of these lines became smaller and the cost of feeding the mules had increased greatly, it was decided early in 1916 to make a trial of electric motor omnibuses as auxiliaries to the railway. They were intended to serve districts where the railway could not operate because of the narrowness of the streets and others in which the population was not dense enough to warrant railway construction. An attempt to operate gasoline omnibuses of European type made in 1914 had failed because of the high cost of fuel and popular dislike, the vehicles being far from comfortable.

Twelve electric buses were purchased, six for twenty-two passengers and six for twelve passengers, and put on two routes. Each bus averaged about 90 miles a day which required three battery charges. The fare was 5 cents with no transfers. At the beginning the average receipts per bus-mile were a little more than 12 cents, but this fell slightly during the summer, and the average for the total period of operation, which ended Oct. 15, 1917, was 10.66 cents per bus-mile. The buses were finally abandoned owing to the high cost of maintenance. During the ten and a half months that the trial continued, 222,894 bus-miles were operated. The gross receipts were $24,185.20 and the total expense of operation and maintenance was $24,466.31.

The buses have been rebuilt for use in various departments of the company so that the investment in them has not been a loss.

Since the spring the Tacoma Railway & Power Company has been employing women as car washers and for grinding but not testing of air-brake valves, etc. The proportion of female clerks has also been increased.

British Fares to Be Raised

House of Commons Passes Bill Permitting Fares Sufficient to Pay Dividends at Three-Fourths of Pre-War Rates

DIVIDENDS at not to exceed three-quarters of the pre-war rates may be paid by British tramways during the war and for two years afterward. This is the result of the recent passage of a bill by the House of Commons providing for increases in the maximum charges under statutory regulation. The bill is the result of two years of petitioning on the part of the Tramways and Light Railways Association and the Municipal Tramways Association.

The bill is yet to be considered by the House of Lords. The relief will probably come so late that the tramways will derive little advantage from it this summer. In the meantime the various undertakings will have opportunities to prepare the individual cases for presentation to the Board of Trade, whose approval is required for increased fares. The proviso that in the case of municipal tramways there may be an increase in the statutory maxima, in order to avoid loss, of as much as 50 per cent should remove from many such lines the imminent danger of recourse to the taxing power.

In commenting upon the measure the *Tramway and Railway World* says:

"As originally proposed utilities were to be authorized to make such charges as would enable them to pay dividends not exceeding one-half of the pre-war rate. After a long discussion, which dealt mainly with the position of the gas companies, the bill was amended in committee, making the dividend rate three-quarters instead of one-half of the pre-war rate. Though the position of tramway owners under the bill is considerably less favorable than that of steam railroad shareholders, the new arrangement must be regarded as not unsatisfactory.

"Whatever may be the case in regard to the other statutory undertakings, there can be no question of the justice of the arrangements so far as tramways are concerned. These undertakings have been dealt with somewhat arbitrarily by the government; their services have been reduced, the wages of the employees have been repeatedly increased by awards by the committee of production, and it is no secret that these awards have been given in some cases not on the merits of the case but because the government stood committed to increases in other industries. If the tramway undertakings, which are essential to the manufacture of munitions, were to be carried on, it was necessary that they should be in a position to cover part at least of their increasing expenses."

The text of the new bill is as follows:

1. (i.) Where it appears to the appropriate government department that the financial position of any undertaking to which this act applies has been adversely affected by circumstances arising out of the present war, the department may, if they think fit, by order provide for the modification of any statutory provisions regulating the charges to be made by the undertakers, and of any statutory provisions consequential on or supplemental to any such provisions as aforesaid, for such period during the continuance of this act, in such manner, and subject to such conditions, as appear to the department to be just and reasonable:

Provided that—

(a) where the undertakers are a local authority no modification shall be authorized which will increase the statutory maximum charge by more than 50 per cent, or which is more than sufficient so far as can be estimated to enable the undertaking to be carried on without loss; and

(b) In any other case no modification shall be authorized which is more than sufficient to enable with due care and management a dividend on the ordinary stock or shares of the undertaking to be paid at three-quarters the standard or maximum rate of dividend, if any, prescribed for the undertaking, or at three-quarters the pre-war rate of dividend, whichever is lower.

(ii.) An application to a department for the purposes of this act shall be accompanied by such information, certified in such manner as the department may require with respect to the financial position of the undertaking in question, and before making an order the appropriate government department shall require the undertakers to give public notice of the application for an order under this act, and as to the manner in which and time within which representations may be made, and to give a similar notice to the council of each county, borough, or urban, or rural district within which any part of the undertaking or limits of supply of the undertaking is situate, and the department shall consider any representations which may be duly made.

(iii.) The undertakings to which this act applies are tramway undertakings, including light railways constructed wholly or mainly on public roads, and undertakings for the supply of gas, water and electricity, and in calculating the maximum charge which may be authorized under this act in respect of such tramway undertakings fractions of one halfpenny shall be calculated as one halfpenny.

(iv.) For the purposes of this act—

The expression "statutory provisions" includes the provisions of any order having the force of an act;

The expression "appropriate government department" means, in relation to gas and water undertakings carried on by local authorities, the Local Government Board, and in relation to other undertakings the Board of Trade;

The expression "local authority" includes any commissioners, trustees, or other public body of persons carrying on, otherwise than for purposes of private profit, any undertaking to which this act applies.

The expression "pre-war rate of dividend" means the average rate of dividend for the three financial years immediately preceding the war.

2. In the application of this act to Scotland the Secretary for Scotland, and in the application of this act to Ireland the Local Government Board for Ireland, shall be substituted for the Local Government Board.

3. (i.) This act may be cited as the statutory undertakings (temporary increase of charges) act, 1918.

(ii.) This act shall have effect during the continuance of the present war and for a period of two years thereafter and no longer.

Payrolls Jump High

Calculated Results of Several Recent Awards of War Labor Board Show 21 to 70 per Cent Increases

INCREASES in payroll of from 21 to 70 per cent seem to be the outcome of the recent wage awards by the National War Labor Board. While complete data are not yet available, statistics for some of the score and more of electric railways whose wage cases have been decided by the board are sufficient to indicate the serious nature of the added drain upon operating revenues.

The following table gives the total payroll of employees affected by the wage awards for the year ended June 30, 1918, together with the same payroll after the application of the new wage rates:

	Payroll for Year Ended June 30, 1918	Payroll Under New Wage Rates	Per Cent of Increase
Galesburg Railway, Lighting & Power Company	$49,392	$76,365	55
Joplin & Pittsburgh Railway	*	....	70
East St. Louis & Suburban Railway	580,000	780,000	35
New York State Railways	3,304,473	4,733,051	43
Pennsylvania-New Jersey Railway	155,460	214,674	38
Cleveland, Southwestern & Columbus Railway	†(a) 160,827	210,601	31
	†(b) 24,314	56,989	131
Omaha & Council Bluffs Street Railway	1,151,829	1,401,829	21
Cleveland & Eastern Traction Company	‡ 2,263	2,736	21

* Year ended June 30, 1917.
† Year ended April 30, 1918.
‡ Month of May, 1918.
(a) Payroll for train employees. (b) Payroll for substation attendants.

It should be observed, regarding the Cleveland & Eastern Traction Company, that the trainmen work from three to four and one-half hours out of nine on the lines of the Cleveland Railway at the latter's expense. When on their own line the men receive under the average hourly wage scale, 38 cents for the first three months, 40 cents for the balance of the first year and 42 cents thereafter, while on the city lines they receive for the first year 43 cents and 48 cents thereafter. Thus the increase in payroll for the Cleveland & Eastern Traction Company is not what it would be if this company had to pay its men for their entire day's work.

The figures given for the Omaha & Council Bluffs Street Railway do not represent the entire current increase in the payroll, for the reason that the company voluntarily increased the rates of all employees on Jan. 1, May 1 and June 1, 1918. The total payroll for all employees for the year ended June 30, 1918, was $1,247,829. The same payroll showing the new War Labor Board rates for the employees affected would total $1,820,673, an increase of 45.9 per cent.

HIGHER THAN STEAM RAILROAD WAGE RATES

The fact that the wage rates authorized for employees other than motormen and conductors are excessive in view of near-by steam railroad rates has been brought out in protests made by the Scranton and Chicago lines. Under the Scranton award track labor will be paid 42½ cents an hour, whereas track labor on the steam railroads operating in the same territory under orders of the Director General of Railroads receives 32½ cents an hour. Car cleaners will receive 42½ cents an hour as compared to a maximum of 37 cents an hour upon steam roads. Janitors will receive 42½ cents an hour as compared to 30 cents an hour on steam roads. Watchmen will receive $153 a month as compared to $71.50 a month on the steam roads—a greater compensation than track foremen. Ordinary labor will receive 42½ cents an hour as compared to 32½ cents an hour upon steam roads. Thus unskilled labor will receive practically the same wage as semi-skilled labor in the carhouses and shops.

The Chicago provision that all employees other than trainmen shall receive practically a minimum of 42 cents an hour will, it is said, produce an excessive wage resulting in confusion and discontent among the men and a great disparity with the near-by steam railroad wages. The Chicago electric railways have joint employees, for example, with the Baltimore & Ohio Railroad. The rate of the Director General of Railroads for gatemen is about $65 a month, but under the War Labor Board award the electric railway employees of this class will receive $150 a month. Similarly, steam railroad track men will receive 32½ cents an hour, but such electric railway employees 42 cents an hour. Electric railway colored porters, now getting about $65 a month will, because of building fires in the morning and banking them at night, be raised to about $150 a month by a twelve-hour shift. This wage is also that received by the most skillful employees, the motormen.

Owing to many changes in schedules and working force during the last year, and the difference in percentages of increase for old and for new men, the Evanston Railway has not determined the effect of its wage award upon the 1917 payroll figures. Taking its regular schedule and shoptime, however, it calculates an increase of $9,460 for twelve months and an increase of $426 for extra shopmen for four months during the winter painting season—a total of $9,886. This does not include others whose pay will have to be increased because of the award to trainmen and shop employees. The percentage of increase for individual classes of employees runs from 15½ to 77 per cent, the car washer with $55.50 additional getting the largest increase.

Skip Stops Will Save 1,500,000 Tons of Coal Annually

United States Fuel Administration This Week Issued Request for Widespread Co-operation in Reduction of Power Waste

As A WAR measure the United States Fuel Administration anticipates that by Sept. 15 the skip-stop system will be in general use throughout the country, effecting a saving at the rate of 1,500,000 tons per annum. Suggestions and instructions have been sent to the Electric Railway War Board, councilmen, mayors, public service and city commissioners, and electric railway officials in all cities of 25,000 population and more. The administration desires that this plan be adopted through voluntary co-operation of the public, municipal authorities and electric railway officials.

Posters containing the lettering shown herewith will be issued by the administration.

SUPPORT THE SKIP STOP!

It will save 1,500,000 *tons of coal per year.*

More coal means more steel;
More steel means more guns and ammunition;
More guns and ammunition, a shorter war and fewer casualties.

SKIP-STOP POSTER OF UNITED STATES FUEL ADMINISTRATION

Before the skip-stop system is started in each city the administration suggests that a board consisting of five members be selected; two representing the city, two the railway and the fifth the Fuel Administration. The city members should obtain the views of the police and fire departments regarding dangerous points of traffic, providing they exist. The duty of this board is to select the car stops and see that instructions regarding the stop marking, advertising and general policy are carried out to the end that the public may be given the best service with maximum fuel economy.

The Fuel Administration has requested that there be not more than eight stops per mile (average 660 ft. apart) in business districts; six stops per mile (880 ft. apart) in residence districts; and four stops per mile (1320 ft. apart) in open country.

All mayors and others in authority are urged to have ordinances passed to keep vehicles off car tracks and keep the tracks clean of obstructions. In this way traffic will be accelerated, much time saved for the community, and power waste reduced. The administration asks also that the railways and the city authorities make every effort to eliminate stops of cars going up hill and around curves. Municipal authorities are urged to do everything they can to reduce the number of stops made by the interurban cars, especially within city limits.

The Fuel Administration states that, already in operation in Chicago, Detroit, Washington, Minneapolis, Brooklyn and many other leading cities, the skip stop is effecting an annual saving of 500,000 tons of coal.

Keeping the Men on the Job

The Houston Company, With Clubhouse, Cafe and Co-operative Association, Shows That the Best Is None Too Good for Employees

WHILE trainmen naturally want all the wages they can get, the size of their pay envelope is not the only or even the biggest inducement to keep them on the job. Human and humane interest in their personal comfort counts for a great deal if that interest is displayed whole-heartedly by the management and not perfunctorily by a clerk.

In the work done along these lines by the Houston (Tex.) Electric Company the first principle is that the best is none too good for the tired platform man. For example, the clubhouse built for the employees has the usual pool tables, games, shower baths, wrestling mat, punching bag, boxing ring, moving picture machine and the like. In the very essential matter of toilet facilities, however, it shows a significant improvement over other so-called clubhouses where the toilets would disgrace a sty. The Houston company believes that men are silently bettered by their environment and that they will take care of facilities when told that these are to be treated as their own personal property. Results speak for themselves; the first-class porcelain and metal fixtures, installed at considerable expense, are treated as if they were appreciated.

"AT-COST" CAFÉ A SUCCESS

More recently the company has further added to the comfort of the men by installing at the Milby clubhouse an "at-cost" café, open from 7 p.m. to 7 a.m. The café was opened on March 8. That it was a huge success is evident from the fact that a neighboring innkeeper, who had been supplying poor food at high prices, soon shut up shop.

The café is on the ground floor of the clubhouse, covering about 400 sq.ft. The men are served at a counter. The equipment consists of a gas stove, a refrigerator with 200-lb. ice capacity, a 3-gal. coffee urn, a 10-gal. water cooler, two metal sinks with hot and cold water, dishes and cooking utensils.

TRAINMEN'S CLUBHOUSE AT HOUSTON, TEXAS

Flies are minimized by screening the entire clubhouse and by using three ceiling fans over the counter. The interior of the café is enameled in white up to a height of 5½ ft. The concrete floor of both café and lobby is flushed clean every day. The woodwork of the café counter is supported by metal legs 4 in. high to prevent dirt from accumulating underneath.

PRICES ARE ATTRACTIVE

These prices, combined with the cleanliness, explain why the men prefer their own restaurant:

Ham and eggs	$0.30	Grape nuts with a glass of milk	$0.10
Two eggs, any style	.10		
Ham sandwich	.10	Post toasties with glass of milk	.10
Cheese sandwich	.05		
Egg sandwich	.05	Coffee or milk	.05
Hot cakes	.10		

Purchases may be made only through the use of tickets sold in strips of ten at 40 cents for a face value of 50 cents. As these tickets are good at their face value in buying, the discount from the foregoing prices is 20 per cent. Tickets are sold by the night cashier, whose office adjoins the café, from 7 p.m. to 7 a.m. The records of such sales are sent to the assistant treasurer, who as the *ex-officio* manager of the café department signs all checks monthly.

SANITARY CAFÉ OPERATED ON THE AT-COST PLAN

Supplies are bought through the purchasing agent upon requisitions made out by the transportation department. Groceries are bought at wholesale through a Houston jobber, and milk comes from a certified dairy. The company pays all overhead expenses, such as rent, light, water, gas and janitor service.

While doing a business of more than $500 a month, the restaurant for March and April did not quite clear operating expenses. The small loss incurred thus far, however, is of no moment when compared with the positive satisfaction of the men who use the café.

With the aid of David Daly, manager, the employees have just organized the Houston Electric Co-operative Association.

Representatives of the Victorian branches of the Australian Tramway Employees Association last month waited on the Minister for Public Works, and asked that airbrakes be installed on the Melbourne electric tramcars. The Minister agreed to place their views before the cabinet, and hoped that a provision to meet the case would be included in the forthcoming tramways bill.

LETTERS TO THE EDITORS

Classification for L.C.L. Freight Condemned

THE CONNECTICUT COMPANY
NEW HAVEN, Sept. 2, 1918.

To the Editors:

I notice a letter in your last issue, commenting on the recent electric freight rate decision of the Indiana Public Service Commission. The author of that letter seems to disapprove of some of the new electric freight rates because they are higher than the corresponding steam railroad rates. To my mind the striking feature of the decision of the Indiana Commission was that after explaining that electric railway freight transportation is more nearly akin to express service than the steam carrier freight service the commission proceeds to establish six classes of freight. The convictions of the commission seem at variance with its finding. I also do not agree with the commission that the terminal cost of handling package freight is less than that of the steam carriers. How anyone can justify six classes of discounts from first-class rate for merchandise classified under the official or C. F. A. classification, when the freight is received in less than carload lots and the various classes move in the same car, I am unable to understand.

The first and most vital thing for electric railway express departments to accomplish is to get away from the use of steam road classifications. The service of electric road was never considered in drawing up these classifications. They therefore have no place on an electric road. As regards less-than-carload shipments on steam roads, nothing should be accepted at less than first-class rate. On electric lines there should be one class, one rate, as there is but one service, although allowances in the classification should be made for unusual shipments. That is to say, light and bulky articles should take higher than first-class rate, while extremely heavy articles should be subjected to two or three times the first-class rate.

You may be interested in the fact that a committee of accounting officers appointed by the Eastern Presidents' Conference rendered a report Jan. 1, 1917, covering its investigation of less-than-carload freight. The committee was made up of the following:

Assistant comptroller, Pennsylvania Railroad, chairman.
General auditor, Baltimore & Ohio.
Auditor of revenue, Delaware & Hudson.
Auditor of freight accounts, Erie Railroad.
Auditor of freight receipts, N. Y., N. H. & H.
Auditor of revenue, New York Central.
Secretary of Eastern Presidents' Conference.

A total of 1358 cars carload freight and a total of 1949 cars less-carload freight were observed and tabulated as to mileage, gross revenue, agency, office and platform expense, gross weight of car and contents, etc. The agency, office and platform expense per car was as shown in the accompanying table.

		Total	Average per Car	Increase (Percentage)
B. & O.	179 carloads	$50.12	$0.17	
	304 l.c.l.	2,600.32	8.56	5,035
D. & H.	100 carloads	51.24	.51	
	112 l.c.l.	695.72	6.21	1,217
Erie	377 carloads	65.57	.17	
	399 l.c.l.	2,386.58	5.98	3,517
N. Y. Central	259 carloads	43.82	.17	
	455 l.c.l.	3,223.73	7.09	4,170
N. Y., N. H. & H	215 carloads	40.26	.19	
	286 l.c.l.	2,429.06	8.49	4,468
Pennsylvania	228 carloads	45.38	.20	
	393 l.c.l.	4,109.17	10.46	5,230
Totals.....	1,358 carloads	$276.39	$0.20	
	1,949 l.c.l.	$15,444.58	$7.92	3,960

The Connecticut Utilities Commission approved our change in classification, the Indiana Commission seems convinced of the same thing, and the recommendations of the Committee of Accounting Officers were:

First—That less-than-carload rates should be increased.

Second—That there should be an increase in the minimum charge per shipment.

Third—That there should be established a minimum charge per package.

Fourth—That there should be a revision of classification for package freight, looking to reduction in the number of classes and establishment of rules that will require shippers to consolidate small packages in one container.

Fifth—That steps be taken to increase the loading of less-than-carload cars.

The Connecticut Utilities Commission approved the Connecticut Company's change in classification from the official freight companies' basis to an "express" basis, and the Indiana Commission seems convinced that the idea is right.

There seems to be a general, if very slow movement, along these lines.

V. S. CURTIS,
General Traffic Agent.

Training Motormen for Emergencies

NEW YORK CITY, Sept. 4, 1918.

To the Editors:

Some time ago there appeared an article on psychological tests for motormen in your publication. This I read with interest. From my own experience and the study of others I believe that no great amount of dependence can be placed on that kind of test. The reason for this opinion is that a studious type of man can easily pass this test but make a complete failure at the controller.

All railway companies realize the danger of the weakness of the "human element," and great precautions are taken to protect against it. Nevertheless, accidents happen every day on some roads and motormen fail because "the correct thing to do in a severe emergency" has not been properly impressed upon their minds. At such a time the reasoning power of a motorman's brain is greatly handicapped by excitement, and he does just what has been impressed on his mind—no more, no less.

Mere rules never will prevent men from failing. Some companies have one rule to cover three or four types of cars in emergencies. This may be right or it may be wrong. Thus a rule for reversing which would work on a four-motor car would be practically worthless on a heavy two-motor car.

I have been in three electric railway wrecks and have seen old and tried motormen fail completely, causing death and destruction. Where was the judgment there? There was none. Excitement had entirely wiped it out, and as the motormen were running their cars automatically, they failed.

A motorman is expected to use judgment, but could a man become a great violin player without practice? The same principle applies to the motorman in an emergency. If he has practiced what to do, he will not fail unless he is a very poor man. That is why I strongly indorse the use of the dummy control stand in the instruction of motormen. What is emergency judgment? Briefly I believe it is at least 75 per cent previous instruction and the rest divided between common sense and steady nerves. The moral of this is, don't depend too much on a motorman's judgment. This is my advice to railway officers, and I know by experience.

Another bad feature of the "human element" in electric railway operation is forgetfulness. For this reason, verbal orders and long drawn-out red tape rules should be tabooed in single-track operation. They don't remind; written orders and signals do, and standard association rules do. For personal reasons I cannot sign my name to this but would like to do so.

A SUBSCRIBER.

AMERICAN ASSOCIATION NEWS

War Board Issues Bulletin in Skip-Stop Campaign

THE Electric Railway War Board has sent out Bulletin No. 29, containing a letter from the United States Fuel Administration, dated Aug. 29, on the subject of skip stops.

This is the communication referred to on page 419 of this issue of the ELECTRIC RAILWAY JOURNAL. The lettter in part is as follows:

> War's excessive coal demands, increasing from day to day, require us to conserve fuel in every possible way. Practically all of the industries of the country are saving fuel. Electric railway skip-stop operation presents one of the largest fields for fuel savings. The Fuel Administration urges that skip-stop service be adopted in the United States in cities having a population of 25,000 or above. The fuel savings effected by this system will be at least 1,500,000 tons annually. We therefore request all electric railways to co-operate fully with the Fuel Administration in its efforts to save coal through the skip-stop system.
>
> We are sending letters to the state fuel administrators, who will in turn communicate with the public service commissioners, mayors, city councilmen, and all others who regulate our public utilities, asking them to assist in putting the skip-stop system into effect on Sept. 15, 1918.
>
> Posters will be distributed to railway companies with instructions to insert them in prominent places in city cars. The posters contain a partriotic appeal to the public, asking it to support the skip-stop system, and explaining why it is an essential war measure.
>
> Using the skip-stop system generally enables cars to be operated at 10 to 12 per cent higher schedule speed. The power saving varies from 8 to 16 per cent. Inasmuch as the cars operate at the higher schedule speed, it can be seen that the same service can be given with a lesser number of cars; or, providing the service warrants it, more service can be given with the same cars.
>
> The importance of having the full co-operation of railway companies in making the skip-stop system a success in every city cannot be emphasized too strongly. This request from the United States Fuel Administration, to the state fuel administrators and all public officials concerned, is merely to have the skip-stop system operative during the period of the war. The continuance of this economic method will in all probability depend upon the way the plan is carried out by the individual railway companies.
>
> We are addressing this letter to you as the representative of the electric railway industry. We expect the American Electric Railway Association War Board to aid in every way possible in securing the maximum fuel savings that are consistent with proper railway service.
>
> We believe it is the patriotic duty of all railway men and of the individual members of the community to conserve fuel and man power by adopting the skip-stop system.

Appended to the letter is a summary of cities in which skip-stop operation has been adopted and an appeal from the War Board for its use wherever possible.

E. R. Hill for President of Engineering Association

AS REQUIRED by the constitution of the Engineering Association, its nominating committee has prepared the following list of nominations: For president, E. R. Hill, New York City; for first vice-president, W. G. Gove, Brooklyn, N. Y.; for second vice-president, C. L. Cadle, Rochester, N. Y.; for third vice-president, C. S. Kimball, Washington, D. C.; for secretary-treasurer, E. B. Burritt, New York City; for members of executive committee, F. C. Bedwell, Newark, N. J.; H. A. Johnson, Chicago, Ill.; L. C. Datz, New Orleans, La.; E. H. Scofield, Minneapolis, Minn.

Increasing Power Plant Efficiency

AT THE meeting of Manila joint company section No. 5, held on July 2, the discussion, which was largely along technical lines, was led by Miguel T. Borja, watch engineer power plant department Manila Electric Light & Railroad Corporation. He read a paper on the "Economical Production and Transmission of Electric Power," and in it enumerated the various pieces of power-plant apparatus essential for the conversion of the heat energy contained in coal into electrical energy. Mr. Borja laid stress on the necessity of keeping all apparatus clean and in good repair. In this connection he pointed out that the improper maintenance and operation of steam boilers results in from 6 to 20 per cent decrease in efficiency and that the condition of the condenser as to cleanliness and vacuum has much to do with the over-all efficiency of the steam turbine to which the condenser is connected. In the company's Morales power plant improved methods of operation in the boiler room have increased the boiler efficiency 10 per cent.

Relative to the efficiency of transmission lines Mr. Borja stated that while the power plant is much handicapped by machinery whose operation and efficiency is largely beyond control, the efficiency of a transmission line can remain as high as is practicable, the only limit being that of invested capital. The average loss in the lines of the company is about 15 per cent, although an additional 10 per cent is unaccounted for. This unaccounted-for loss is now being studied in an endeavor to eliminate it.

Pamphlet Describes Submarine Problems

The Naval Consulting Board and the War Committee of the Technical Societies have recently sent to the members of the technical societies a pamphlet entitled "The Enemy Submarine." It contains information already published of the construction of submarines, their methods of attack, an account of torpedoes used and their action, as well as the methods proposed for defensive and offensive protection.

Gasoline Motor Section Cars Decrease Labor and Cost of Track Maintenance

Maintenance of Way Department, Pacific Electric Railway, Uses Gasoline Motor Section Cars and Motor Velocipedes in Maintaining Signals and Tracks

BY CLIFFORD A. ELLIOTT
Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

SEVERAL years ago the Pacific Electric Railway was able to reduce the number of men necessary for maintaining its track by providing power-driven equipment for the men to travel to and from their work. Additional mileage was assigned to each section foreman for maintenance and with a view of enabling the section gangs to reach their work quickly and without unnecessary fatigue, the use of hand cars was done away with and gasoline motor section cars were used to transport the laborers, their tools and small quantities of track material for repairs over the lines. This company has some 1200 miles of interurban lines to be maintained and now uses fifteen cars of the Fairbanks-Morse type to care for track maintenance and for use in bridge inspection work. At times a push car is coupled to the Fairbanks-Morse No. 33 gasoline section car in order to carry a few ties, track bolts, spikes, joints, etc., for making quick repairs in emergency cases, or as supplies for ordinary track maintenance work.

The company has 216 automatic flagmen installed at various public highway crossings and the maintenance of the signal bells at these locations is consolidated with the work of caring for the switch lights. In order to handle this work efficiently Buda Company's No. 10 NH one-cylinder gasoline motor velocipedes (Fig. 3) were provided, together with Fairbanks-Morse No. 26 two-cylinder cars (Fig. 1) for the same class of work. This readjustment of the men's duties of maintaining the warning signals and switch lights resulted in a very great saving of time and money.

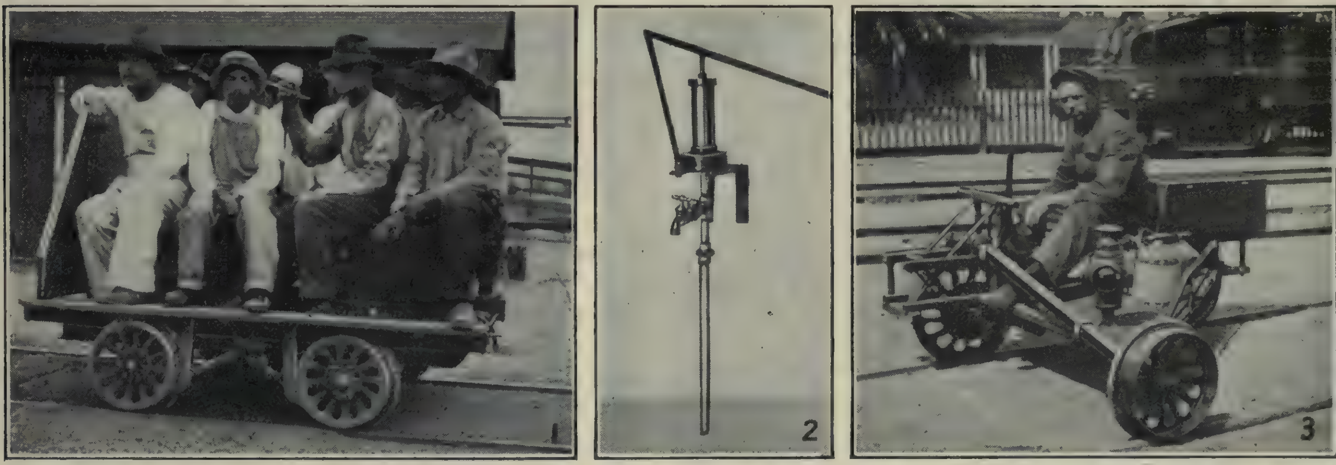


FIG. 1—GASOLINE MOTOR SECTION CAR; FIG. 2—GASOLINE PUMP IN TOOL HOUSE; FIG. 3—GASOLINE MOTOR VELOCIPEDE

The operation of these various classes of gasoline driven equipment made it advisable to provide gasoline supply stations at various points. Up to date the company has constructed twelve such stations, locating these at section camps where store and tool houses are provided and where the various track gangs assemble before proceeding to their day's work.

A standard supply station consists of a 100-gal. iron-oil tank sunk about 3 ft. below the surface of the ground. A 2-in. feed pipe with the necessary cap and air vent is provided for filling. A ¾-in. galvanized iron pipe leads from this 2-in. pipe to a pump installed inside the tool house. Two check valves are installed in this pipe, which make it unnecessary to recharge the pump to start the oil flowing when pumping. The pump is fastened to the wall of the tool house by an iron bracket which steadies it during the operation.

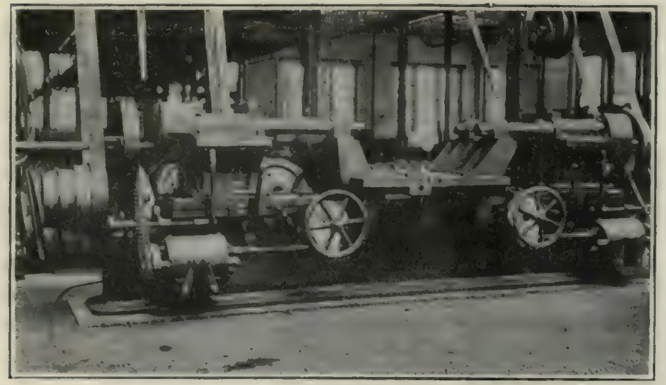
"Shooting Out" the Smokestack

A SIMPLE method of loosening soot in a chimney which is recommended by E. I. du Pont de Nemours & Company, and said by them to cause no injury to the stack or lining, is as follows:

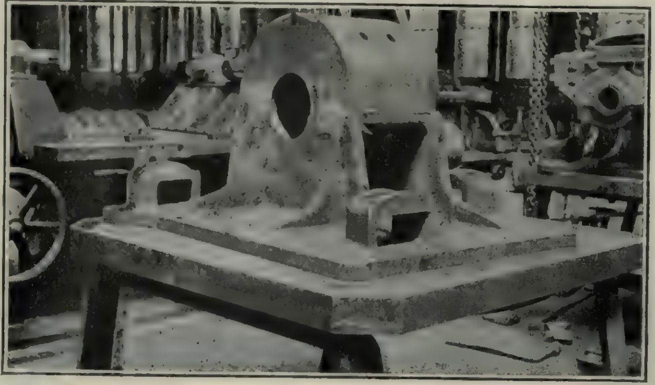
One or more charges of FFF blasting powder are discharged vertically in the stack from a cannon. This can be made of a piece of old 4-in. shafting, from 14 in. to 16 in. long, in the center of which a 1¾-in. hole 10 in. long is bored. A ½-in. hole is bored through the piece to the bottom of the center bore to serve as a touch hole for inserting the fuse. The whole thing can be mounted on a pedestal about 6 in. in diameter so that it will stand in an upright position.

The method of operation is this: The powder is poured into the mouth of the cannon to about 2 in. from the top and it is tamped to the collar with dry clay. The fuse is inserted in the touch hole and in contact with the charge. The cannon is set at the bottom of the stack and the fuse ignited through the flue door, the latter then being closed. This charge is sufficient for a stack up to 100 ft. high and 4 ft. in diameter or more, the number of shots necessary thoroughly to clean a stack depending upon its condition. It is said that ordinarily three or four shots will clean a stack.

A coal-rationing scheme will shortly be introduced in Great Britain to compensate for the shortage in coal supply caused by the going into war service of a large number of miners.



FOUR-SPINDLE BORING MILL ARRANGED FOR BORING MOTOR SHELLS, CHICAGO SURFACE LINES



JIG AND ASSEMBLY TABLE MADE IN CHICAGO SURFACE LINES SHOPS TO HOLD MOTOR IN PLACE FOR REBORING

Utilizing a Four-Spindle Boring Mill to Rehabilitate 3000 Motors

Chicago Surface Lines Rebores Four GE-80 Motor-Bearing Seats Simultaneously, With a Record of Eleven Shells Per Day

ON THE Chicago Surface Lines it was for some time the practice to rebore motor shells on an ordinary engine lathe. Later a standard horizontal boring mill was used. With either of these machines it was necessary to reset the shell and change the boring bar each time a shell was bored. In 1917 it was decided to procure a machine which would handle this work more efficiently.

A four-spindle boring machine built by the Beaman & Smith Company was purchased, and after it had been remodeled in the Chicago shops it was fitted with Davis expansion boring bars made especially for this work. These bars run in special guides and have micrometer adjustment of the cutters. Two special jigs and two assembly tables were also built in the Chicago shops.

For the reboring process the motors, which are of the GE-80 split type, are taken from the trucks in the carhouses and brought into the shop. Here the armature and fields are taken out and the shell is cleaned. The shell is placed on the jig, which rests on the assembly table, by means of the shop traveling crane, and it is located by means of bolts passing through the pole pieces into corresponding holes in the jig. The final adjustment is made by setting the shell to a gage which gives its exact location relative to the assembly table. The axle and armature-bearing caps are bolted in place and the shell and jig are lifted to the boring mill table where the jig is located by dowel pins and clamped down by the cap screws tapped into the mill table.

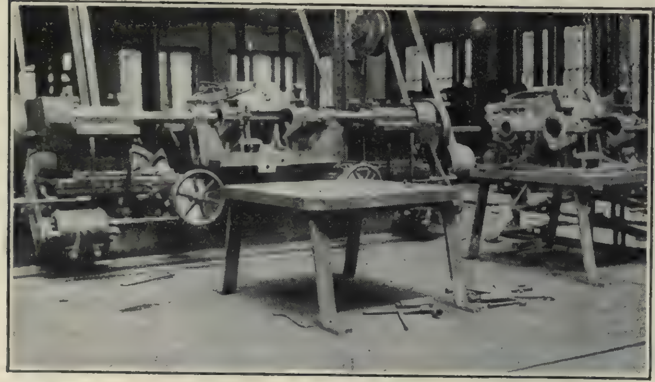
The work is handled by a machinist and two helpers, the helpers setting up a second shell while the first is being bored, thus keeping the machine working almost continuously. The mill operates at a cutting speed of 42 ft. per minute, and a $\frac{1}{32}$-in. feed per revolution, all four holes being bored simultaneously. The diameter of the axle and armature bearing seat is increased $\frac{1}{8}$ in., and new bearings are made to suit. Eleven shells have been bored in one day of nine and three-quarter hours, the average being nine to ten shells per day.

The armature bearings are made of brass and lined with $\frac{1}{16}$-in. babbitt. The axle bearings are also made of brass, but are not lined. The dowel pins for the armature bearing caps are being replaced by keys anchored in the caps. The axle caps and old dowel-pin holes are being filled by use of the oxyacetylene torch and redrilled and fitted with the case-hardened dowel pins.

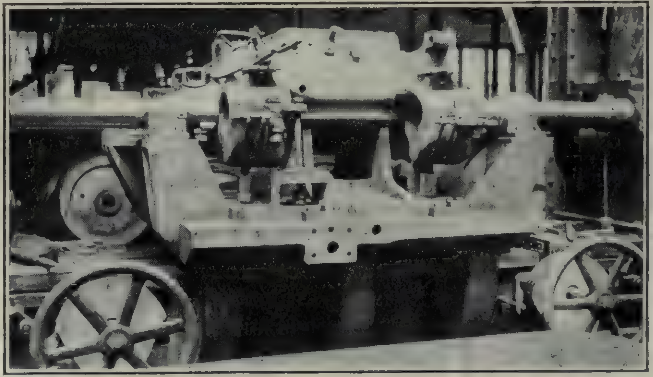
The commutator and armature bearings are made $\frac{1}{4}$ in. longer than they were originally, and a $\frac{3}{16}$-in. groove is turned on the outer end. A galvanized-iron cap is fitted over the end and is crimped into the groove, thus making the bearing practically dustproof.

In some cases it has been found necessary to build up the gear case seats on badly worn shells, also to plane off the axle and armature bearing caps to insure their truing up in the boring.

From the boring mill the shell is taken to the truck department, where it is cleaned and painted, and the motor is assembled. The motors which are being rebored have been in continuous service since 1905 without previous reboring. There are 3000 shells to be rebored.



ONE MOTOR SHELL ON BORING MILL TABLE WHILE SECOND IS BEING ASSEMBLED



MOTOR SHELL READY FOR SIMULTANEOUS REBORING OF FOUR BEARING SEATS

Solid Manganese vs. Manganese-Insert Special Work

Supplementing the Author's Article in the Oct. 13, 1917, Issue of This Paper—Conclusions Favor Solid Manganese

BY W. L. WHITLOCK
Office Engineer the Denver (Col.) Tramway

IN JULY, 1910, this company placed a four-square 90-deg. crossing at the intersection of Fifteenth and Lawrence Streets, which was a portion of the grand union layout built for this location and exhibited at the electric railway convention in this city during that year.

Three of these crossings were manganese insert work while the fourth crossing was solid manganese. The manganese inserts were a source of continual maintenance while the solid manganese crossing has cost practically nothing to maintain, thus giving an actual comparison as to the relative value of the two different types of crossings, as both were subjected to the same amount of traffic.

DENVER SPECIAL WORK—FIG. 1—GENERAL VIEW OF SPECIAL WORK; FIG. 2—PRESENT APPEARANCE OF INSERT SPECIAL WORK; FIG. 3—PRESENT APPEARANCE OF SOLID MANGANESE CROSSING

To-day the manganese insert work is "shot to pieces," so to speak, and will be reconstructed at once, while the solid manganese crossing is apparently good for ten years more life.

The manganese insert was repaired time after time by the usual spelter process until such a condition was reached that the spelter did not hold long enough to warrant its further use. We then tried the experiment of thermit welding these inserts which was outlined in the ELECTRIC RAILWAY JOURNAL of Oct. 13, 1917, page 685. At the time when my 1917 article was written the substitution of thermit for the spelter was promising, but later it proved to be unsatisfactory in that it did not weld the manganese insert to the insert casting. In this experiment we had the co-operation of the manufacturers of thermit who were, however, not over-sanguine as to the outcome.

One advantage of the use of thermit did show up in this experiment, namely, that, while the weld cracked around the edges of the insert and did not make a bond at this point, it did provide a solid foundation under the insert. Inasmuch as the bond was not complete between insert and the casting, a "rocking" motion or movement occurred under traffic and this resulted in the breaking up of the insert itself.

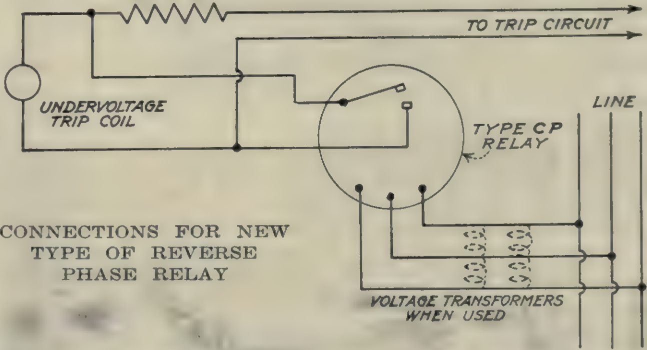
We had one case where a loose insert "jumped" out of the casting under a car and wedged in under the truck in such a manner as to cause a bad derailment, prior to the use of the thermit.

The accompanying photographs were taken of the crossings referred to. Fig. 1 shows a general view of the special work with the manganese insert crossing in the foreground with the solid manganese crossing back of it. The curve crossing in the background is a manganese insert layout also. Fig. 2 shows a close-up view of the insert special work as it appears to-day, while in Fig. 3 is the solid manganese crossing to-day. The only work done on the solid manganese crossing since its installation was the welding up of, and grinding off level of the frog points after seven years of service.

Relay to Protect Motors Against Phase Reversal

IF A three-phase motor is disconnected from a circuit and the phases reversed when it is reconnected, it will, naturally, run backward. Such a reversal may occur and has occurred when the motor is disconnected for repairs, through an error in reconnecting leads at the power house or substation, or from a number of other causes.

In many cases the reversal of rotation of a motor, aside from the inconvenience it causes, is not a serious matter as the error can be corrected at the motor terminals. In other cases, however, serious consequences may result. The reversal of an elevator motor, for instance, might result in wrecking the machinery and loss of life.



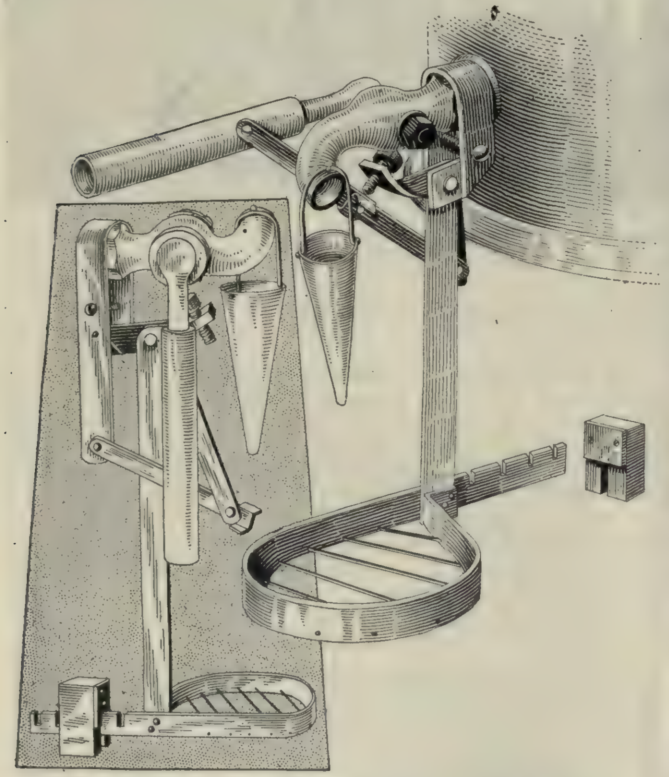
CONNECTIONS FOR NEW TYPE OF REVERSE PHASE RELAY

To protect motors against phase reversal the Westinghouse Electric & Manufacturing Company has developed a reverse-phase relay. If a phase is reversed, if a phase fails, or if the voltage drops below 75 per cent of normal, the relay contacts close and trip the circuit-breaker, either through a shunt-trip coil or by short-circuiting an undervoltage trip coil having a series reverse resistor.

The relay operates on the induction principle. When properly connected the torque holds the contacts open against the restraint of a spiral spring. On low voltage the torque diminishes and the spring closes the contacts. On reversal of phase connections the reversed torque assists the spring in closing the contacts.

Automatic Oil Can Filler Prevents Waste

TO PREVENT the overflowing of oil, through carelessness or misjudgment, while oil cans are being filled, the arrangement shown in the accompanying illustration has been devised to provide an automatic safeguard. The apparatus is constructed of strap iron $\frac{3}{4}$ in. x $\frac{3}{16}$ in. and is intended for attaching to the faucets of oil tanks or barrels used in shops. The can to be filled is placed in the tray of the apparatus and a small counterweight is placed on the end of the lever to balance the weight of the can. The opening of the faucet brings the two links, forming a toggle joint, into contact with the adjusting screw at the end of the lever supporting the can. As the can is filled its weight causes the lever to swing and the screw to press on the toggle joint. As soon as this is forced over dead center the faucet is closed by the action of the lever and weight attached to it. No springs are used. The set screw on the large swinging arm can be adjusted for any sized can and provides a definite closing point within very close range. The small swinging funnel shown in the illustration is merely a safety device for use when filling small cans.

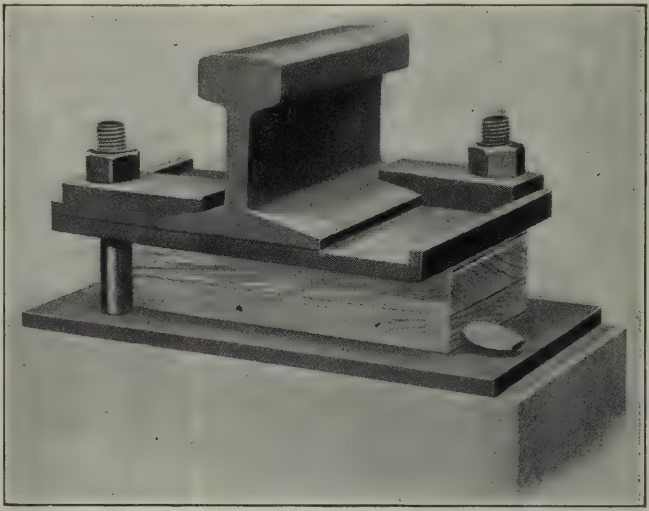


AUTOMATIC FAUCET CLOSING DEVICE FOR FILLING OIL CANS

Fittings for Shimming Tracks

Detailed Description of An Adjustable Track Shim That Can Be Easily and Cheaply Applied and Removed

THE freezing and thawing experienced during the winter season produces inequalities in the roadbeds of electric roads and makes it necessary to shim the rails in order to correct these rough conditions. The usual practice consists of inserting wooden wedges and slabs under the rails. These are spiked to the ties usually by the same spikes that hold the rails in position. Where the shimming is heavy the spikes do not penetrate the ties to sufficient depth to insure proper fastening.



ADJUSTABLE TRACK SHIM

The "Trasco" adjustable track shim has been placed on the market by the Track Specialties Company, New York, in an endeavor to provide a more substantial construction for shimming and at the same time to provide for adjustment as the track alignment changes. This device consists of two plates and two clips for clamping the rail. The bottom plate is securely spiked to the ties and the rail resting on the top plate is held by two clamps and fastened to the bottom plates by two carriage bolts. These bolts are inserted head down, the bottom plate being countersunk to receive the head and provided with a square hole to receive the square shank of the bolt. This keeps the bolt from turning in applying the nuts.

Wooden wedge-shaped shims are inserted between the two plates to give the alignment desired. The plates are provided with corrugations next to the wood to keep the shims from slipping when they are once clamped in position and in addition two small holes are provided in the top plate so that nails can be driven into the shims if desired.

The advantages claimed for this construction are these: (1) Adjustments as small as one-sixteenth inch are possible. (2) Adjustments can be easily and quickly made by loosening the nuts and driving in wedge shims to give the desired height. (3) Inequalities can be corrected as often as necessary and the shims applied year after year without the necessity of purchasing new parts. (4) The device provides a safer method for track shimming than that usually employed.

Recent Happenings in Great Britain

War Conservation Measures Largely Monopolize Attention of Managers of English Properties

(From Our Regular Correspondent)

In connection with the appointment of a select committee to investigate the question of the transport of goods, the highways committee has made a recommendation which has been adopted by the London County Council that an expenditure of £100 should be incurred in the conversion of two tramcars for an experiment in the carriage of goods on the Council's tramways. The highways committee has also reported that in view of representations from the Royal Commission on Paper, experiments have been made in the use of canvas bags on tramcars for the collection of used tickets. Only about 12 per cent of the tickets have been deposited in the bags, but it is believed that if an appeal were made to the public and all cars were fitted with bags a better result would be obtained, and the Council has adopted the committee's recommendation that £800 should be expended upon bags. It is stated that the Glasgow Corporation, which uses annually 272 tons of tickets, collects not more than 50 per cent of them.

London Saves 100 Tons a Year

The London County Council has saved 100 tons of pulp a year by simplifying its tickets, and the annual consumption is now only 270 tons, a much smaller quantity on the basis of the number of passengers carried than that consumed in Glasgow. If one-third of the tickets used were collected in the bags they would realize at present prices about £720 a year. The proposal has been made, however, not primarily on a commercial basis, but in view of the national need for saving paper.

Short Strike in Liverpool

A tramway strike occurred in Liverpool recently involving a considerably curtailed service for a day or two. The strike was the result of trouble between the National Tramways and Vehicle Workers' Union, which has headquarters in London and is affiliated with the Transport Workers' Federation and the tramway section of the Municipal Employees' Association, which claims 90 per cent of the tramway employees as members. The latter association called for a strike by the employees as a means of protest against the managerial methods.

Considerable Disorder at First

At its start the strike was marked by animated scenes. Early in the morning a crowd of women conductors stopped the munition workers' cars on one of the routes, and in the evening a number of strikers made for cars leaving a depot, pulled the women conductors off, threw mud at the drivers, smashed the windows of the cars, and cut the trolley ropes. At a meeting of the strikers it was agreed to submit the matter to arbitration, and the following statement, signed by Mr. Mallins, the general manager of the tramways, was read: "We desire to state that the tramways committee at a special meeting formally approved of the course adopted by the secretary of the Municipal Employees' Association in applying to the Chief Industrial Commissioner to arbitrate on the demands of the Liverpool Tramway workers, and agreed to abide by the result of such arbitration. They further agreed that the workers on returning to work forthwith should be reinstated, and that the general manager or his deputy would be pleased at all times to see the secretary or a duly accredited official of the Municipal Employees' Association with respect to any bona-fide complaints that may exist."

Mr. Spencer Resigns from Bradford

C. J. Spencer, the general manager of the Bradford Corporation Tramways, has tendered his resignation to take effect on Nov. 1, in consequence of having accepted a position with the Underground Electric Railways, London. Mr. Spencer has been general manager of the Bradford tramways for more than twenty years, during which time the receipts have risen from £8,000 in the first year to nearly £400,000 last year. It is estimated that the current year will result in revenue of about £500,000.

Coal Economy Necessary

A meeting of the Board of Trade advisory tramways committee of the Lancashire, Cheshire and North Wales districts was held recently in Liverpool, to consider the question of the economizing of coal in the generating of electricity, and it was decided that the present supply must be curtailed by 15 per cent. This departure will possibly result in a reduction of the tram services. Considering the large amount of work of national importance that is being done in Liverpool it is not expected that the service will be very much restricted, but an alteration will undoubtedly be made by the railways in the runs to the outside places in Lancashire and Cheshire.

The North-Eastern Railway has adopted an electrically-propelled luggage barrow, which in the near future will be brought into use at the Leeds and other important stations on the system. The new barrow is similar in size to the old four-wheeled luggage carrier still in general use, and is capable of carrying approximately 25 cwt. of luggage. The driver of the barrow stands on the front, and there ma
lates the guiding and propelling
ratus. The present unusual short
labor has prompted the innovati
the railway.

The text of the statutory und
ings (temporary increase of cha
bill—the measure designed to
on gas, water, tramway and e
undertakings, power to increase
charges—is published elsewhere i
issue.

Reports of Interest to Invest

When presiding at the recent
eral meeting of the British E
Traction Company, Ltd., the cha
said that several reports had be
sued by government departments
ing the year which deserved c
study by all who had invested i
electrical industry. He called
shareholders' attention to three re
The first was by the Board of
electrical trades committee in reg
the position of the electrical trad
ter the war; the second by the coa
servation sub-committee of the
try of Reconstruction on Ele
Power Supply in Great Britain
the third was that of the com
appointed by the Board of Tra
consider the question of electrical
supply. These three reports w
condemnation of the electrical le
tion of the last thirty-six years,
vindication of the men who had
sistently opposed the legislation a
tendencies.

Power Distributing Centers Pla

Plans are in preparation for a s
of far-reaching importance in
tion to the generation and supp
electricity within a large portion
Midland area. The project for
leading factor in the national pla
the establishment of great powe
tributing stations in various cent
the country. It is proposed to s
the new works on the banks o
Trent in the immediate vicinity o
tingham, the area of distributio
bracing on one side, within a 40
radius, Derby, Leicester, Burt
Trent, Stafford, and Lichfield, and
of the intervening places trending
Lichfield in the general directi
Coventry.

The Nottingham Corporation i
suming responsibility for the sc
and the committee appointed to co
the matter has arrived at the u
mous conclusion that Nottingham
possesses all the essential facto
quired in any area for a scheme o
character, including (1) ample s
of water for condensing purposes
proximity of collieries, (3) ra
communication between collieries
suitable sites adjoining the River
(4) large industries requiring el
power. Taking 40 miles as a r
over which electric power can be
nomically supplied, many impo
towns would, as indicated, be incl
with smaller places and numerous
in the various counties. A.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE · PERSONAL MENTION · CONSTRUCTION NEWS

Seattle Questions Unsettled

Company Rejects Proposal of City to Lease Railway Lines for Fixed Rental

The officials of the city of Seattle, Wash., and the Puget Sound Traction, Light & Power Company are apparently as far apart on the question of settling the transportation problem in Seattle as they were at the beginning of conferences weeks ago. The city's offer to the company to lease the lines in the city and pay the company a set rental has been unequivocally refused by the traction officials.

Company Makes Sale Offer

A counter proposition has been presented to the city by the company offering to sell the system to the city, the difference in the earnings of the company under the proposed agreement and the earnings of the company for the five-year pre-war period to be deducted from the sale price. The company failed to set a definite price on its properties, or to announce the principles which would govern in the fixing of the price.

The situation has been further complicated by a possibility that unless some action is taken within a few days, the trainmen of the company will refuse to wait longer for payment of the wage schedule agreed upon, and will seek other employment.

Realizing that no progress is being made by the city and traction officials in relieving the impending seriousness of the transportation situation, the United States Shipping Board through its local representative, Capt. John F. Blain, district officer, and Edward A. West, Pacific Coast representative of the passenger transportation and hauling division of the board, on Aug. 30 issued an ultimatum to the city and traction officials, outlining an operating agreement which, it is insisted, must be adopted at once by the City Council.

Company's Proposal Rejected

At the same time that the letter from Captain Blain and Mr. West was sent out, Mayor Ole Hanson and Councilman T. H. Bolton, president of the Council, signed a letter addressed to the Puget Sound Traction, Light & Power Company, rejecting the company's counter proposal and reiterating the city's offer to lease the company's lines for a period up to six months after the end of the war.

Mr. West, in a recent conference with city officials, criticised the city and traction officials for not coming to some satisfactory operating agreement, and asserted that the period when the government seriously considered taking over the city railways and operating them as a part of its war program had passed.

Mr. West stated that the government was perfectly willing to help finance the transportation situation in Seattle, but that it would not be a party to building up competitive systems which were not devoting their whole energies to the winning of the war. He states that the sensible thing for the city to do is to build the proposed elevated municipal line (for which the government will extend the necessary loan) and then allow the traction company's equipment to be used over this line to take care of shipyard workers. Mr. West states that the government will not, on his recommendation, advance money for the traction company to build another line into the industrial district, but will do everything possible to aid the construction of the line on Avalon Way, which is needed for workers engaged in essential occupations in that section.

Mr. Walsh on Labor's Future

Frank P. Walsh, joint chairman of the National War Labor Board, sent a message to be read at the Labor Day celebrations. Mr. Walsh said in part:

"This world war has provided the beginning of a splendid education in democracy. In this re-examination the country has discovered one thing at least about democracy—that it must mean more than old-fashioned political democracy. The old idea that when everybody votes you have a democracy is pretty well exploded.

"This country, I promise you, is beginning to understand that we may have 100 per cent democracy in the form of our political government, and yet have autocracy of the most despotic type in industry. It is now clear to understanding men, and especially to those who work for a living, that to attempt to control the conditions of one's life through the roundabout way of political oratory and legislative action is futile, and that this old-fashioned attempted substitute for a direct and common-sense control through the workshop must be thrown into the scrap heap of pre-war absurdities. Political democracy is a delusion unless builded upon and guaranteed by a free and virile industrial democracy.

"I believe that the process of democratization will continue until there will remain not one wage worker in the country deprived of full voice in determining the conditions of his job and consequently his life."

Philadelphia Insurance Plan

$7,000,000 Blanket Policy Placed With Metropolitan Company Under Modified Co-operative Plan

Providing for life insurance for its employees under the amended co-operative plan, the Philadelphia Rapid Transit Company, by action of the board of directors on Aug. 26, arranged for a $7,000,000 insurance policy with the Metropolitan Life Insurance Company, New York, in the form of a blanket policy, effective on Sept. 1, 1918. Under this, each employee a year in the service may secure a $1,000 policy, in accordance with terms of the plan. This is in addition to the money received by virtue of the workmen's compensation act and, also, in addition to $1.50 a day sick benefits and $40 a month pension payable under the terms of the amended co-operative plan.

The terms of the life insurance policy are most favorable to the employees. Many of the older employees could not, except for this plan, secure insurance upon their lives at any price. An individual policy for $1,000 will be given into the personal custody of each member. In the event of the employee leaving the service, the insurance company undertakes to reinsure such employee without requiring a physical examination. Employees who leave the company to engage in military or naval service are not insured while absent; they are, however, assured of reinsurance as soon as they return to the employ of the company.

Nearly All Eligibles Sign

Because of the great inroads made by the draft and other governmental activities, only about 7000 of the company's employees out of a total of 10,000 have as yet become eligible by being one year in service. Practically all of the eligibles have signed the cards approving the plan and the insurance becoming effective under this blanket policy as of Sept. 1 will approximate $7,000,000. This amount will increase as the newer men become eligible by being in service one year until a possible sum of $10,000,000 may be taken.

Some very interesting sidelights upon the question of insurance and sick benefit protection among the company's employees have developed. In one instance, a man who has been with the company for many years has been paying at the rate of $72 a year for a $1,000 policy. Under the co-operative plan, he will be enabled to obtain the same protection, plus sick benefits of $10.50 a week and a $40 monthly pension, for an annual outlay of $12.

Protests Wage Award

New Orleans Company Wants Award Suspended, but Will Pay Back Wages

The board of directors of the New Orleans Railway & Light Company, New Orleans, La., has decided to pay its employees the increased back pay resulting from the award of the War Labor Board, notwithstanding the fact that the company's application for a reconsideration of the case and a suspension of the award has been acknowledged and taken under consideration by the War Labor Board and no decision has been rendered thereon. Payment will be made without prejudice to the company's right to persist in its application for reconsideration and suspension.

The company says that in previous statements made to the public its reasons for applying for a reconsideration and suspension have been clearly set forth. The company feels in a general way that the award grants to certain classes of labor wages greatly in excess of what the steam railroads are paying similar labor, and in many instances common labor receives a higher wage than certain conductors and motormen.

Prior to the labor award, the company borrowed $1,000,000 from the War Finance Corporation to enable it to meet its obligations. The company has been holding out of this money a sum sufficient to pay its city taxes so as to protect itself against delinquency and not to embarrass the city of New Orleans in the collection of its necessary revenue for public purposes. In determining to pay the increased back wages, the company has been compelled to encroach upon the fund which it had reserved for taxes. In this way alone is it able to make the payment.

Interurban Terminal Plan Revived

The plan of building a new combined steam and interurban passenger station to face on the Public Square at Cleveland, Ohio, has been revived, but just what interests are behind it cannot be learned. Former Governor Myron T. Herrick will be chairman of a committee of five business men which will serve in the intiation of an ordinance providing for the relocation of the passenger traffic of the city, and it is supposed the Van Sweringen brothers are the backers. The Cleveland Union Terminals Company, with a capital stock of $10,000, was recently incorporated by Attorneys John L. Cannon and Charles W. Stage, and they have represented the Van Sweringens in the past.

O. P. and M. J. Van Sweringen control the Cleveland & Youngstown Railway and the Nickel Plate Railroad. They are also building a large freight terminal in what is known as "the flats." Many of the features of the proposed new depot fit into plans they have had in mind for several years, including a depot which was to be connected with the new Hotel Cleveland, now nearing completion.

Roads from the West and Southwest would come to the new location through Walworth Run from West Thirtieth Street over a new bridge to be built across the Cuyahoga River. Those from the east and southeast would come to the station through Kingsbury Run. The present tracks through the city would thus be turned over entirely to freight service.

Plans call for separate grades for steam roads and interurban lines. All of them can reach the point without much trouble. The building would face north at the southwest corner of the Public Square.

Chicago Corruption Charges Fail

Failing to find evidence on which to base indictments supporting the charges of bribery and corruption made by the State's Attorney in connection with the new Chicago traction ordinance, the Grand Jury on Aug. 31 resorted to the unusual procedure of indicting the ordinance itself. This was the outcome of charges of undue influence and counter charges of "politics" which have stirred the people of Chicago since the new franchise was approved by the City Council recently.

The State's Attorney did not encourage the suggestion that Special Counsel Fisher for the city be allowed to explain the ordinance to the jurors. The result was a lengthy report with an appendix prepared by the State's Attorney giving 168 reasons why the ordinance should not be indorsed by the people. The grand jury condemned the ordinance as a "vicious, ill-considered, hasty and one-sided bargain." The local newspapers refuse to take the charges seriously and it has been suggested that a special session of the City Council be called to demand an investigation by a special State's Attorney. Meanwhile much capital is being made of the adverse report in the pending political campaign.

During the inquiry by the Grand Jury many Aldermen were subpoenaed as witnesses.

Engineers and Draftsmen Wanted

The Division of Engineering, United States Employment Service, 29 South La Salle Street, Chicago, Ill., has received an urgent call from important industries for fourteen trained men. The call is a varied one and is indicative of the present need for experienced engineers and draftsmen of training and ability.

The Division of Engineering will not consider applicants who are already engaged in essential industries, as it is concerned only in filling war needs and not in creating them.

All technical men who wish to enter the service of the Division of Engineering should address A. H. Krom, Director of Engineering, 29 South La Salle Street, Chicago, Ill.

Women a Problem

The Eternal Question Has a N
Phase Owing to Objections by
Cleveland Men

After a day of discussion over
right of the Cleveland (Ohio) Rail
to put women on the cars as con
tors, the local union officials annou
on Aug. 31 that all further movem
would be delayed, pending the arr
of W. B. Fitzgerald, vice-presiden
the Amalgamated Association, to
part in the negotiations. He was
pected in Cleveland early in the w

MEN DEMAND INQUIRY

The men asked the company to
operate in an investigation as
whether a sufficient number of
could be obtained to operate the
and that women conductors be rem
from the cars pending the investiga
The company interposed no objectio
an investigation, but could see no
son for its co-operation in making

The request to remove women
ductors from the cars was refused
J. J. Stanley, president of the
pany, announced that the comp
would continue to employ both men
women, the men to take places as mo
men. Mr. Stanley told the officials
the shortage of men was so serious
400 daily trips have been discontin
The union men insist that the cont
between the company and the u
provides that the latter shall be
sulted in case of any intention to
ploy women, but Mr. Stanley de
that there was any provision of
kind in the contract.

An investigation was put under
the latter part of last week by Fie
Sanders, Street Railway Commissio
to determine whether everything p
ble was being done to secure male
Both he and Mayor Davis declared
adequate service was the first co
eration. While they would prefer t
male help employed, the company
take any it can secure rather tha
low the service to suffer.

WOMEN NOT TO REPLACE MEN

The union has been assured tha
men will be discharged to make
for women. While many women
been put on the cars for training,
one has actually been put in charge
car. A car on the Euclid Avenue
was operated by a woman on Aug

William Rea, secretary of the
branch of the Amalgamated Ass
tion, notified President Stanley on
3 that all the men would leave
cars at midnight on Sept. 4 unless
women conductors were withdraw
2 o'clock that day, pending the
pletion of an investigation into
need of employing women. Mr.
ley said the company would not
render its right to employ whomev
saw fit. The union officials claim
if an investigation shows that a
cient number of men cannot be sec
to operate the cars, no objection wi
made to the employment of wome

News Notes

Full Service on New York Line.—ractically all of the men on the Third venue Railway, New York, N. Y., who eft their positions through the sus-ension order of their union have since pplied to be reinstated. The undesir-bles the company refused to reinstate. ars on all lines were running on chedule on Aug. 28.

Cincinnati Employees Grow Impa-ent.—Officers of the local branch of e Amalgamated Association at Cincin-ati, Ohio, state that the men will not ait for a referendum on the newly re-ised franchise ordinance recently assed by Council for an advance in ages. They will not strike, the officers ay, but will seek other employment here better wages are paid.

Strike in Texarkana.—Service on the nes of the Southwestern Gas & Elec-ic Company in Texarkana, Tex., was rippled on Aug. 20 by a strike of otormen. All but three of the reg-lar motormen failed to report for duty, ut cars were manned by other em-loyees and a semblance of service was aintained. The grievance of the strik-ng motormen is that the company re-used to discharge an employee at their equest.

Another Twin City Wage Advance.—fter a conference with the Co-oper-tive Association of Employees, Horace owry, president of the Twin City ines, Minneapolis, Minn., announced n increase in wages effective on Sept. , not naming the per hour increase, ut saying that with the increase in ages granted on Aug. 1, the expenses ould be increased $900,000. The resident said with the increased ex-ense it will be necessary to rearrange chedules and decrease the service fur-her, giving only the service absolutely ecessary to carry the public. The age advance is the fourth in a year.

Montgomery Employees Strike.—The mployees of the Montgomery Light & raction Company, Montgomery, Ala., ent on strike on Aug. 17. The ques-ions of unionization and wages are aid to be involved. An agreement was eached between Colonel Clarke, com-anding the division at Camp Sheridan, resident Tillis of the company and he union for the operation of all cars o and from the camp. The union men olunteered to operate the cars on ondition that Mr. Tillis would pay the egular wages and would not attempt o put non-union men on any of the amp lines. Mr. Tillis agreed to the roposition.

Atlantic City Men Want More.—The latform men of the Atlantic City & Shore Railroad, Atlantic City, N. J., want an additional 5 cents an hour for each conductor and motorman. The men are now receiving from 31 to 35 cents an hour on the Atlantic Avenue division and from 33 to 37 cents an hour on the Ocean City division for a day of ten hours to be completed within twelve hours. The men also demand recognition of the union. Another matter which the men want settled is the employment of Atlantic City firemen to operate cars when the firemen are not on duty for the city. The railway contends the employment of firemen is necessary if it is to keep all the needed cars running.

Wages and Fares Coupled in Louisville.—In the matter of the demand of the union on the Louisville (Ky.) Railway for an increase in wages, the company has offered the men a temporary advance of 7 cents an hour and asks the union to allow it three months' time in which to have the books of the company examined, to ascertain if the present earnings will allow the increase demanded. The union has refused to accept these terms and will place the matter in the hands of the War Labor Board for adjustment. The railway is making an effort to have fares raised so that it will be in position to meet the demands of the union and has asked that the Louisville Board of Trade cooperate with the company in securing the higher fares.

Buffalo Employees Stick by Company.—Union platform employees of the International Railway, Buffalo, N. Y., will continue to work for the wage increase granted them by the company on June 1. This provides for the sliding scale between 35 cents and 42 cents an hour. The scale of wages allowed by the War Labor Board, an increase of 6 cents an hour over this pay, was made contingent upon the company's right to collect a 6-cent fare. At a meeting of the company's employees it was agreed to remain at work on the old scale of wages until such time as the company is relieved from the obligation of charging a 5-cent fare and then a demand would be made that the company pay the scale recommended by the War Labor Board.

Spokane Men Want Increase.—Increases in wages for trainmen of the Spokane (Wash.) Traction Company to 50, 55 and 60 cents an hour have been asked by the union committee on wages. A conference on the new schedule was held with officers of the company. It is understood the proposal includes a request for an eight-and-half hour day. The increases are based as follows: For the first six months, 50 cents an hour; for the second six months, 55 cents an hour; after the first year, 60 cents an hour. The men are now being paid on a scale announced about two months ago, as follows: First year, 33 cents an hour; second year, 34 cents an hour; after third year, 36 cents an hour; fifth year, 37 cents an hour; and after that 39 cents an hour. Men on one-man cars are paid 4 cents an hour additional.

Wage Conference in New York.—Arrangements were made for a joint conference during the week ended Sept. 7 between the officials of the Interborough Rapid Transit Company, New York, N. Y., and representatives of its employees to readjust the wage scale. The present wage scale expired on Sept. 1, and in his frequent communications with the Mayor early in the year on the subject of an increase in fares, T. P. Shonts, president of the company, stated that it would be necessary to increase wages. Employees of the company have been endeavoring to agree upon the amount of increase which would be satisfactory to all, but the matter was left in abeyance until after it could be discussed with the company. Relations between the brotherhood of employees and the company officials have always been cordial, and no fear has been expressed that an amicable agreement would not be reached.

Ottawa Wage Award Announced.—The Ottawa (Ont.) Electric Railway has accepted the award of the Dominion Labor Board of Appeal, which recommended that the employees of the company should be granted a wage schedule providing a minimum rate of pay of 35 cents an hour and a maximum of 39 cents. The increase in wages which the employees have obtained in all branches, together with the overtime, will mean an additional annual expenditure to the company of more than $200,000. The company contends this means that practically the net earnings of the road this year will go to the employees, and that if the company is to survive, an increase in the passenger tariff is inevitable. The men struck recently following an award made by a conciliation board. Settlement of the matter was then referred to the Dominion Board. The men have also accepted the award.

Program of Meeting

American Bankers' Association

The forty-fourth annual convention of the American Bankers' Association will be held in Chicago the week of Sept. 23 to 28. It will be a war convention, and the various sessions will be devoted largely to addresses on topics of the day.

Among the speakers who will address the convention are W. H. Vandervoort of the Root & Vandervoort Engineering Company, East Moline, Ill., whose subject will be "Relations Between Employer and Employee."

The Savings Bank Section's program includes a discussion of "The Effect of the War on Railroad Securities," by Samuel Untermyer, counsel to the National Association of Railroad Security Owners, and Francis H. Sisson, vice-president of the Guarantee Trust Company, New York.

Samuel Insull, president of the Commonwealth Edison Company, Chicago, will discuss the situation in respect to public utility securities.

Financial and Corporate

Electric Railway Statistics

Situation in Eastern District More Alarming Than That in Either Southern or Western

The outstanding feature of the comparison of operating statistics for electric railways for May, 1917 and 1918, compiled by the information bureau of the American Electric Railway Association and presented herewith, is the increase in the operating ratio.

For the entire country this amounts to 2.72 per cent, the ratio for 1918 being 67.67, as against 64.95 in 1917. The worst situation is found in the Eastern district, where there has been an increase of 3.32 per cent, as against 2.30 for the Southern district and only 1.58 for the Western district.

The per cent of increase in operating expenses for the country is almost twice the per cent of increase in operating revenue, while for the Eastern district it is a little more than double. Thus, for the country, the operating revenues have increased 5.86 per cent, while operating expenses have increased 10.28. In the East the increase in revenue amounts to 5.41 per cent and the increase in expenses 10.91 per cent. The Southern district fares better, the increases being 11.99 and 16.37 per cent respectively. The West shows the best ratio between these two items, the figures being 5.66 per cent and 8.22 per cent respectively.

The net earnings for the railways show a decrease of 2.35 per cent and again the showing in the Eastern district is the worst, an actual decrease of 5.09 per cent being recorded. Both the South and West show increases, the figures being 5.69 and 0.87 per cent.

The returns from the city and interurban electric railway companies, as shown in detail in the appended tables, have been classified according to the following geographical grouping: Eastern District—East of the Mississippi River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

Interborough Bonds Offered

A syndicate composed of J. P. Morgan & Company, First National Bank, National City Company, Harris, Forbes & Company, Lee, Higginson & Company, Halsey, Stuart & Company, and Kissel, Kinnicutt & Company has been formed to sell $33,400,000 of Interborough Rapid Transit Company's three-year 7 per cent secured convertible notes at 98½ to yield investors slightly more than 7½ per cent. The War Finance Corporation has agreed to take $12,500,000 of the notes, with the understanding that in the event that the syndicate succeeds in disposing of the entire issue of $33,400,000 it will be relieved of its obligation, the War Finance Corporation being compensated just as it was in the case of the recent Bethlehem Steel Corporation financing. The notes are to be secured by $52,187,000 of Interborough Rapid Transit Company first and refunding mortgage 5 per cent bonds, and will carry the privilege of conversion into such bonds at 87½ with adjustment of interest. The notes are to be redeemable at 103 and interest during the first year, 102 and interest during the second year, and during the third year they will be redeemed at 101 and interest.

Disaster Ahead

John A. Beeler Favors National Administrator and Remission of Onerous Franchise Terms

John A. Beeler, traffic engineer and adviser to the Public Utilities Commission of the District of Columbia, following his return on Aug. 30 from a trip through the East, where he gathered information first-hand as to conditions confronting the traction companies, declared the situation to be far more serious than is generally recognized. Mr. Beeler states that increased cost of labor and materials, taxation and jitney competition have all but put some companies out of business and are threatening the existence of others.

As an immediate measure of relief he urges favorable action by the government on the proposal, already submitted, that a national administrator or board be appointed with power of recommendation, advice or request to the state and municipal authorities which exercise control over this class of utilities. Mr. Beeler suggests that such official should put all economy measures possible into effect in the operation of lines and permit the charging of increased fares when other means of relief have failed. Mr. Beeler said:

"Many companies are now operating at a loss and face bankruptcy. Disaster confronts the industry unless something is done. Public service will be paralyzed. In many cases all possible economy measures have been introduced and still receipts are falling behind expenditures. In such cases authority to raise fares should be given.

"There should be a readjustment of all street railway taxes and some taxes should be abolished. Jitneys should not be allowed to compete with traction concerns where adequate service is furnished. Business concerns should stagger their hours for employment. Finally, efficient co-operation should be developed among employees.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS MAY, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
		Per Mile of Line				Per Mile of Line				Per Mile of Line				Per Mile of Line		
	Amount, May, 1918	1918	1917	% Increase Over 1917	Amount, May, 1918	1918	1917	% Increase Over 1917	Amount, May, 1918	1918	1917	% Increase Over 1917	Amount, January, 1918	1918	1917	% Increase Over 1917
Operating revenues	$14,894,753	$2,060	$1,946	5.86	8,844,971	$1,869	$1,773	5.41	$1,364,887	$1,681	$1,501	11.99	$4,684,895	$2,780	$2,631	5.6
Operating expenses	10,075,107	1,394	1,264	10.28	6,109,555	1,291	1,164	10.91	837,499	1,031	886	16.37	3,128,053	1,856	1,715	8.2
Net earnings	4,819,646	666	682	†2.35	2,735,416	578	609	†5.09	527,388	650	615	5.69	1,556,842	924	916	0.8
Operating ratio, per cent	1918, 67.67; 1917, 64.95				1918, 69.07; 1917, 65.65				1918, 61.33; 1917, 59.03				1918, 66.76; 1917, 65.18			
Average number of miles of line	1918, 7,229; 1917, 7,095				1918, 4,732; 1917, 4,672				1918, 812; 1917, 756				1918, 1,685; 1917, 1,667			

COMPANIES REPORTING TAXES

Operating revenues	$10,322,043	$1,983	$1,881	5.42	$5,391,527	$1,605	$1,520	5.59	$643,946	$1,945	$1.716	13.34	$4,286,570	$2,831	$2,712	4.3
Operating expenses	7,107,484	1,366	1,273	7.31	3,834,445	1,142	1,071	6.63	402,079	1,215	996	21.99	2,870,960	1,896	1,779	6.5
Net earnings	3,214,559	617	608	1.48	1,557,082	463	449	3.12	241,867	730	720	1.39	1,415,610	935	933	0.2
Taxes	716,423	138	128	7.81	368,647	110	101	8.91	50,747	153	141	8.51	297,029	196	182	7.6
Operating income	2,498,136	479	480	†0.21	1,188,435	353	348	1.44	191,120	577	579	†0.35	1,118,581	739	751	†1.6
Operating ratio, per cent	1918, 68.89; 1917, 67.68				1918, 71.15; 1917, 70.46				1918, 62.47; 1917, 58.04				1918, 66.97; 1917, 65.60			
Average number of miles of line	1918, 5,204; 1917, 5,122				1918, 3,359; 1917, 3,300				1918, 331; 1917, 326				1918, 1,514; 1917, 1,496			

† Decrease.

Best Year Ever

W., B. & A. Revenues Show Remarkable Gain of 65 per cent for 1917 From War Traffic

Unlike most interurban railways throughout the country, the Washington, Baltimore & Annapolis Railroad during the calendar year 1917 showed the best year in its history. The patronage between the terminal cities, as well as between local points, exhibited a decided increase. During the year 385,000 more passengers were carried between Baltimore and Washington than during the preceding year. This was an average increase of 1050 passengers per day.

The company's gross revenues at $1,560,125 represented a gain of $613,922 or 64.9 per cent over those for 1916. The largest preceding increases had been around 11 per cent in 1912 and 1916. Since 1909 the revenues have risen 154.8 per cent. The detailed results for the last two years are given in the accompanying statement.

Comparative earnings statistics for the last three years follow:

	1917	1916	1915
Per car-mile (cents)	8.98	42.53	40.47
Per mile of single track	$15,175	$9,545	$8,550
Per mile of road	$28,380	$17,220	$15,390
Per passenger (cents)	38.68	37.56	35.97

In July, 1917, the United States government began the construction of one of its army cantonments at Admiral, Md., approximately 2 miles west of Naval Academy Junction. This cantonment is now known as Camp Meade, and occupies approximately 9700 acres, 4100 of which are located north of the track and used for camp quarters, parade grounds, etc., and 5600 acres of which are located south of the track and used for maneuvering purposes. The land was leased from the owners by the railway through its subsidiary, the Terminal Real Estate Company, which latter company subleased it to the United States government.

In order to take care of the travel incident to Camp Meade, it was necessary to construct 5 miles of additional track to provide double-track facilities between Naval Academy Junction and the center of the camp. The company also constructed two large stations.

During the year the company added to its equipment eight modern, high speed Westinghouse electric locomotives and fifty-four modernly equipped trail cars. On account of the increase in rolling stock it became necessary to enlarge the carhouse facilities, and the board of directors authorized the construction of a modern brick and concrete paint and carpenter shop at an expenditure of $35,000.

The growth of the freight business kept pace with that of the passenger, so that, like the passenger terminal in Baltimore, the freight terminal is now seriously congested. The directors have had under consideration the desirability of combining the terminals on one plot of ground, a portion of the land for which has already been purchased.

During the last year Congress authorized additions to the Naval Academy buildings at Annapolis costing $3,500,000 to provide for an increase in attendance at the academy of 1000 naval students, which is about 100 per cent more than the number previously enrolled. This will result in still further increases in freight and passenger business to Annapolis.

COMPARATIVE INCOME STATEMENT OF WASHINGTON, BALTIMORE & ANNAPOLIS RAILROAD FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Railway operating revenues	$1,560,125	100.0	$946,202	100.0
Railway operating expenses	738,596	47.3	511,616	54.1
Net revenue from railway operations	$821,529	52.7	$434,586	45.9
Net revenue from auxiliary operations	25,574	1.6	12,680	1.3
Net operating revenue	847,103	54.3	447,266	47.2
Taxes assignable to railway operations*	129,052	8.3	50,934	5.4
Operating income	718,051	46.0	396,332	41.8
Non-operating income	12,893	0.8	13,340	1.4
Gross income	730,944	46.8	409,672	43.2
Deductions from gross income	268,293	17.2	262,578	27.6
Net income	462,651	29.6	147,094	15.6

*This includes income and excess profit taxes.

Favors Washington Merger

John A. Beeler, traffic adviser to the Public Utilities Commission of the District of Columbia, long favoring a consolidation of the two electric railway systems of Washington, has taken the position that such a consolidation is now looming up as imperative, from practically every point of view. The rapidly diminishing man-power in the industrial world, due to army needs; financial considerations of first moment; the serving of the public by careful utilization of available man-power, thereby getting a maximum of efficiency from a minimum of men and track equipment—all demand, Mr. Beeler holds, the utmost effort for consolidation. Some time ago the movement toward the unification of the railway systems of the District was accelerated by the appointment of committees from both the Washington Railway & Electric Company and the Capital Traction Company to confer with a view of devising a plan of closer co-operation or unified or single management to be submitted to the Public Utilities Commission of the District and to the boards of directors of the companies.

Interurban Revenues Rise

Higher Operating Costs of Illinois Traction System, However, Cause Reduction in Net

Each department of the Illinois Traction System, Peoria, Ill., during the calendar year 1917 showed an increase in gross revenues over the results of the preceding year. The interurban lines showed up particularly well with a gain of $616,059, or 15.4 per cent. The city lines, however, secured an increase in revenue of only $87,245 or 2.8 per cent.

The gains in gross were more than offset by the increases in operating expenses and taxes, for while the gross revenues rose $1,474,423 or 11.7 per cent the expenses and taxes increased $1,659,379 or 22.1 per cent. As a result the gross income fell off $184,955 or 3.6 per cent. The fixed charges increased, and the amount which was available for depreciation and dividends was $1,172,152 for 1917 as compared to $1,473,232 in 1916.

On the interurban lines increases in various rates, and particularly in rates on coal, grain and industrial switching, were made effective. The resulting increased revenue, with the additional tonnage handled which amounted to 24.55 per cent, was a substantial contributing factor in the total increase shown for the interurban department.

INCOME STATEMENT OF THE ILLINOIS TRACTION SYSTEM FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Interurban lines	$4,609,898	32.8	$3,993,836	31.8
City lines	3,198,056	22.8	3,110,811	24.7
Gas	1,035,169	7.4	923,642	7.4
Electric	4,295,501	30.6	3,689,851	29.4
Heat	383,092	2.7	341,379	2.7
Water	15,151	0.1	14,476	0.1
Miscellaneous	504,004	3.6	492,450	3.9
Total gross revenues	$14,040,870	100.0	$12,566,477	100.0
Operating expenses and taxes	9,149,176	65.1	7,489,797	59.6
Gross income	$4,891,694	34.9	$5,076,649	40.4
Interest on bonds, etc.	3,719,541	26.5	3,603,417	28.7
Net income	$81,172,153	8.4	$1,473,232	11.7

The additional cost of steam coal was $456,011. The increased labor expense was $316,679. The increase in taxes, including the new federal taxes, was $285,473. These three items, therefore, represented an increase of $1,058,164 in expenses over last year.

Bridge Line Ordered Removed

County Commissioners of Tom Greene County at San Angelo, Tex., have ordered the sale of the rails across Chadbourne Viaduct in that city. These rails are owned by the Texas Electric Light & Power Company, a Strickland property. They have never been used, as the company claims it is impossible at this time on account of the war to get materials necessary to complete the line. The commissioners entered their order when the company refused to bear its share of paving across the viaduct.

Financial News Notes

Virginia Company Changes Name.—The Blue Ridge Light & Power Company, Staunton, Va., has filed for record a change in its name to the Shenandoah Traction Company.

Texas Line Files Capital Increase.—The Rio Grande Valley Traction Company, El Paso, Tex., has filed an amendment to its charter in the office of the Secretary of State at Austin increasing its capital stock from $300,000 to $500,000.

Kansas Road Suspends.—The Iola (Kan.) Electric Railroad, running between Iola and La Harpe, has ceased operations at least for the present. Owing to the fuel and labor shortages the receiver of the road, Louis E. Lanigan, decided that it was best to suspend. The company operates 10½ miles of road.

Receiver for Ohio Road.—Charles J. Finger was appointed receiver of the Columbus, Magnetic Springs & Northern Railway, Richwood, Ohio, on Aug. 24, by the Court of Common Pleas of Delaware County, Ohio. All claims due on account of the railway should be properly enumerated and forwarded to the receiver on or before Sept. 10.

Woodstock-Sycamore Line Sold.—W. J. Fulton, master in chancery, has sold the property of the Woodstock-Sycamore Traction Company, Sycamore, Ill., at auction, realizing $119,850. The road extends from Sycamore to Genoa and Marengo, a distance of 25 miles. The rails and ties will be sold as junk. The buyer was the Hyman-Michaels Company, Chicago, Ill.

Road Being Dismantled.—The tracks of the New Jersey Rapid Transit Company running through Sea Isle City, N. J., which have not been used for the past two seasons, are being taken up and the rails will be shipped to France. A number of unused sidings and switches along railroad lines will also be removed and similar disposition made, together with all the extra rails not in use. Ties are also to be removed. Those unfit for relaying will be used to make charcoal.

Want Present Receiver to Continue.—Eastern creditors of the St. Petersburg & Gulf Railway, St. Petersburg, Fla., seeking to foreclose on a mortgage given to cover bonds, have instructed their attorneys in Tampa to insist that Charles M. Allen continue as receiver. At a conference of the creditors and their attorneys in Jacksonville recently it was urged that the foreclosure suit should be filed at once and that Mr. Allen had best not act as receiver for both the St. Petersburg Investment Company and the railway. Now the Eastern creditors want Mr. Allen to continue as receiver pending final judgment providing for the sale of the railway property.

Respite for Bowling Green Company.—When the motion to appoint a receiver for the Southern Traction Company, Bowling Green, Ky., which had been made by City Attorney Guy H. Herdman, acting for the city of Bowling Green and the County of Warren, was argued before Judge Moss, J. S. Lewis, president of the company, agreed to have the cars in operation within two days and the court granted him that time, with the understanding that unless the agreement was complied with the case would be heard. Recently the court ordered that the company repair its wires and cars, as it was claimed that their condition jeopardized the safety of the public. The company agreed to make the repairs, but had not done so, nor has it operated any cars since that time. The suit for a receiver was brought to force the operation of the cars.

Will Offer Monongahela Valley Bonds.—The National City Company, New York, N. Y., expects to offer for subscription $5,500,000 five-year, 7 per cent general mortgage bonds of the Monongahela Valley Traction Company, Fairmont, W. Va., at 97 and interest, to yield slightly more than 7¾ per cent. The company operates a system of urban and interurban electric railways in West Virginia and Ohio consisting of more than 177 miles of track. It also does the entire electric and gas business in a number of cities and towns, and owns valuable coal mining properties. The company has outstanding $8,288,861 of common stock, paying 5 per cent, and $3,431,730 of cumulative preferred stock, paying 6 per cent. The proceeds of the bonds now offered will be employed for the retirement of $2,829,000 one-year 6 per cent notes due on Feb. 1, 1919, and for the completion of a construction program.

City Line Being Torn Up.—The Tiffin, Fostoria & Eastern Railway is tearing up the rails at Riverview Park, Tiffin, Ohio, and the work will continue until all of the city tracks are removed. The company and the City Council were unable to come to terms on the operation of the city lines. The company claimed that an audit of its books showed that with fares at 5 cents straight the lines have been operated for a long time at a financial loss to the company. The company proposed to maintain a cash fare of 10 cents and sell six tickets for 45 cents. The council would not agree to this but had an ordinance drawn up providing for a cash fare of 8 cents and six tickets for 40 cents. The company refused to entertain this proposal. The section from Riverview Park to the Rock Creek bridge will be taken up first and after that portion is removed the work of tearing up the remainder of the line will begin at the park, up Huss Street to the line on Sandusky Street and through that portion operated in Highland. The interurban line will not be affected.

Electric Railway Monthly Earnings

COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$95,152	*$38,130	$57,022	$32,681	$24,341
1m., June, '17	83,126	*31,987	51,139	28,977	22,162
12m., June, '18	1,178,395	*465,669	712,729	383,640	329,089
12m., June, '17	988,222	*373,889	614,333	342,303	272,030

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$102,080	*$51,988	$50,092	$12,838	$37,254
1m., June, '17	80,026	*44,656	35,370	11,677	‡25,425
12m., June, '18	1,018,128	*562,238	455,890	150,701	‡326,293
12m., June, '17	895,313	*484,742	410,571	118,805	‡291,766

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$96,236	*$69,198	$27,038	$6,865	$20,173
1m., June, '17	101,371	*66,845	34,526	4,653	29,873
12m., June, '18	1,272,064	*832,669	439,395	77,145	362,250
12m., June, '17	1,216,516	*774,451	442,065	60,447	381,618

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$25,679	*$18,991	$6,688	$5,006	$1,682
1m., June, '17	27,758	*18,360	9,398	5,117	4,281
12m., June, '18	337,476	*219,327	118,149	60,591	57,558
12m., June, '17	340,082	*199,437	140,645	62,237	78,408

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$60,984	*$47,264	$13,720	$16,502	†$2,782
1m., June, '17	55,516	*36,415	19,101	15,715	†3,386
12m., June, '18	781,551	*540,523	241,028	193,044	47,984
12m., June, '17	856,429	*441,399	215,030	186,754	28,274

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$259,162	*$165,336	$93,826	$65,655	‡$75,238
1m., June, '17	179,405	*112,192	67,213	29,126	38,087
12m., June, '18	3,078,818	*1,747,266	1,331,552	343,630	‡1,074,172
12m., June, '17	2,088,392	*1,227,416	860,976	349,248	511,728

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$24,510	*$18,433	$6,077	$8,212	†$2,135
1m., June, '17	23,652	*17,236	6,416	7,472	†1,056
12m., June, '18	305,871	*228,136	77,735	77,735	†16,981
12m., June, '17	309,892	*225,693	84,199	87,119	†2,920

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$42,732	*$26,200	$16,532	$8,103	$8,429
1m., June, '17	30,147	*15,893	14,254	7,729	6,525
12m., June, '18	417,518	*259,589	157,929	95,348	62,581
12m., June, '17	297,414	*172,588	124,826	93,007	31,819

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$96,677	*$65,253	$31,424	$24,784	$6,640
1m., June, '17	79,183	*51,578	27,605	24,040	3.565
12m., June, '18	1,071,436	*719,354	352,082	295,909	56,173
12m., June, '17	888,906	*587,338	301,568	286,324	15,244

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$83,134	*$51,095	$32,039	$5,085	$26,954
1m., June, '17	78,234	*46,025	32,209	4,370	27,839
12m., June, '18	1,003,642	*583,089	420,553	60,699	359,854
12m., June, '17	997,737	*542,852	454,885	52,255	402,630

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*Includes Taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

Rhode Island Wants More

Company There Files New Tariff After Central Five-Cent Zone Proves Inadequate

New schedules of rates have been filed with the Public Service Commission of Rhode Island by the Rhode Island Company, operating in Providence and other cities. The new rates would become effective on Sept. 15. The commission has announced an inquiry by it into the matter. The company is now charging 5 cents within a short central zone with an additional charge for rides outside.

A. E. Potter, president of the company, has addressed the following letter to Chairman Bliss of the commission:

"The zone system which was authorized by your commission, effective May 5, 1918, furnished some added revenue to the company. As compared with last year the increase in receipts for the month of May was 8.82 per cent and for the month of June 8.30 per cent. In July our general business was not so good as it was in July last year, due not only to unfavorable weather, but to the fact that many of our citizens between the ages of twenty-one and thirty where in the service.

PATRONAGE FALLS OFF

"This, together with economies upon the part of others, due to the high cost of living, resulted in diminished patronage, particularly on lines to the pleasure resorts. These conditions were sufficient to offset any benefit derived from the zone system. Definite figures are not as yet available.

"The estimated income from the present zone system was based very largely upon the operating conditions for the year ended Dec. 31, 1917. Since that time operating conditions have been growing more and more unfavorable. For six months ended June 30, 1918, our gross revenue fell short by $256,647 of meeting our operating expenses, taxes and fixed charges.

"On May 18 it was necessary to make substantial increases in wages. These increases, it is estimated on the basis of hours worked last year, will amount to at least $300,000 per annum. As a little more than half of this amount will enter into our operating expense for the year ending Dec. 31, 1918, this increase for this year will amount to $150,000 in round figures.

"In addition to this the Providence Division, No. 618 of the Amalgamated Association has petitioned the National War Labor Board for an increase in wages, asking for platform men 60 cents an hour and similar increases for all other employees who are members of the association.

"The company has filed an answer to this petition with the War Labor Board, stating that it is in no financial position to pay any increase in wages whatsoever; but even if the wages are to remain the same as to-day, it is very evident that we shall have to pay more and more for material, and the indications are that under the conditions as outlined our operating expenses, taxes and fixed charges will exceed any gross that it is reasonable to expect by approximately $750,000 for the calendar year 1918.

"The tariffs which were filed to become effective Sept. 15, 1918, will, it is calculated, produce added revenue sufficient to meet our present and anticipated operating expenses and fixed charges. These estimates were made for the Rhode Island Company by Ford, Bacon & Davis."

Theodore Francis Green, one of the trustees under the decree in the New Haven dissolution case in which that company is required to dispose of its electric railway holdings, is reported to have said:

"I do not believe the people of the State want to see the property of the Rhode Island Company disintegrated. I do not believe they want to see the nonpaying lines abandoned. I do not believe they wish the United Traction Company to be a factor in the local transportation situation again.

"But the only other possible solution is for the State to operate the system as a whole on the so-called 'service-at-cost' basis."

Freight on Cash Basis

The Ohio Electric Railway, Springfield, Ohio, has inaugurated a cash system for its freight business. No transportation charge will be allowed to run longer than three days and then it must be under a special arrangement.

In the ordinary run of business payment of prepaid charges is to be made to the forwarding agent when the goods are shipped, and payment of collect charges is to be made when freight is delivered.

For convenience in some cases, a one-day settlement basis will be used. When prepaid freight is received for shipment, the agent will at once mail the bill to the shipper. The same thing is done by the receiving agent when goods are shipped collect. In all cases checks must be mailed the next day.

The only plan that approaches a credit basis is where a period of three days is allowed for the settlement of bills, either prepaid or collect. Violation of the terms cancels the credit and shippers and consignees must file bonds if they wish to enjoy this privilege.

Six Cents for Denver

Mayor Expected to Sign Ordinance Passed by City Council—Interurban Increases Pending

The City Council of Denver, Col., on Sept. 3 passed the ordinance for a 6-cent fare on the city lines of the Denver Tramway. It was expected that the Mayor would approve the ordinance on Sept. 4. On that day the company went to hearing before the State Utilities Commission for similar action concurrently for an increase of rates on the interurban lines. Favorable action on this application is expected within a week.

PUBLICITY PAYS

The company has had its fare case before the public for some time. So effective was its campaign of public education through advertising that it had no trouble in securing in a couple of days 7600 names, or more than three times the number needed to initiate an ordinance. This petition for an ordinance regulating fares contained a bill which included in its provisions the following:

"The Denver Tramway shall be entitled to receive 6 cents and no more for a single passage on any line of the company's railway within the city and county of Denver; provided, that children under six years of age, when accompanied by a paying passenger, shall be carried free of charge, and children over six years of age and under twelve years of age at half fare, and the conductor in charge of each car shall at all times be provided with and have for sale tickets, both whole fare and half fare, to accommodate those wishing to purchase same.

"Sec. 2. That at the expiration of the war and at the time of the surrender to private management of the possession and control of the railroads taken over under the act of Congress passed the twenty-first day of March, 1918, and not to exceed one year and nine months following the date of the proclamation by the President of the United States of the exchange of ratification of treaties of peace:

FIVE CENTS AFTER THE WAR

"The Denver Tramway shall be entitled to receive 5 cents and no more for a single passage on any line of the company's railway within the city and county of Denver; provided, that children under six years of age, when accompanied by a paying passenger, shall be carried free of charge, and children over six years of age and under twelve years of age at half fare, and the conductor in charge of each car shall at all times be provided with and have for sale tickets, both whole fare and half fare, to accommodate those wishing to purchase same."

Another section of the petition submitted to the Council said that the ordinance was necessary for the immediate preservation of the public health and public safety.

St. Louis Wants Zones

After Two Months of Six-Cent Fare, Company Asks Three-Zone System With Five-Cent Central Area

The 6-cent fare which went into effect on the city lines of the United Railways of St. Louis on June 1 is not producing sufficient revenue, and Richard McCulloch, president, has applied to the Missouri Public Service Commission for a test of a three-zone system with a minimum 5-cent fare in the central area. In the company's opinion, a further increase in unit fare would discourage short-haul traffic and involve a clumsy fare arrangement, while the zone system proposed is "fairest" and "entirely practicable."

On May 11, as previously recorded in this journal, the commission authorized a 6-cent fare in St. Louis but retained jurisdiction of the case, requiring the United Railways to make monthly reports and requesting that a study be made of the feasibility of a zone system.

SIX-CENT FARE INADEQUATE

From experience with the 6-cent fare during June and July, it is evident to the company that the new rate does not carry out the intent of the commission, since it does not pay operating expenses and taxes, provide for an adequate replacement fund and earn a 6 per cent return on the investment. Using the results during June and July as a basis for forecasting the remainder of the year, and spreading three months' back pay of $350,000 (already paid) over the entire year, the city lines during the calendar year 1918 will show a deficit of $641,500 in earning a return of 6 per cent on $52,800,000, the figure assumed by the commission as the valuation of the city property. On the same basis, the county lines will show a deficit of $694,500 in earning a 6 per cent return on $7,200,000, the assumed valuation of the county property.

If the fare on the county lines were fixed at 2½ cents a mile, effective Oct. 1, 1918, as has been requested, the increase would be only $72,000 and the county deficit for the year would still be $662,500. If this county deficit is added to the city deficit on the theory that after establishing a reasonable rate of fare in the county the city lines should take care of the county deficit, the total deficit would be $1,264,000. To take care of this deficit, an additional charge of ½ cent per passenger would have to be made on the city lines. This estimate does not include probable increases in the cost of power, and probable increase in State and federal taxes.

REVENUE GAIN IS 14 PER CENT

The 20 per cent increase in the city fare on June 1 resulted in a revenue gain of only about 14 per cent, and a loss of 4½ per cent of the passengers. The details are given in the accompanying statement. The company considers that the greater part of this loss is in short-haul traffic, partly on account of the increase in fare and partly on account of the annoyance of the clumsy 6-cent fare. A further increase in fare to 7 cents or perhaps 8 cents, the company avers, would drive away still more short-haul riders until a further increase in fares would yield no increase in revenue. Furthermore, a 6, 7, 8 or 9-cent fare is a clumsy arrangement, as it involves the use of two or more coins instead of one; and many passengers look upon it as really a 10-cent fare, as it leaves only a few pennies after the odd fare has been paid.

ZONE SYSTEM IS ENTIRELY PRACTICABLE

The company believes that it should return to a minimum 5-cent fare, and that an endeavor should be made to adjust the other city rates of fare as far as possible in proportion to the length of ride. In outlining its plan the company says:

"Payments of fare on a strictly mileage basis would be out of the question, as it would involve too much accounting. The fairest method, and an entirely practicable method, of solving this problem, is the installation of a zone system on the city lines with a minimum fare of 5 cents, the other fares being adjusted equitably to provide sufficient revenue. If, after some experience, it should be found that the revenues needed further adjustment, the rates of fare in the second and third zones could be readjusted without change in the zone limits, or the zone limits might be changed, still maintaining the minimum 5-cent fare. The methods for the collection and accounting of fares would remain the same with any change in the rate of fare in the second or third zone.

EFFECT OF SIX-CENT FARE ON CITY LINES OF ST. LOUIS

	Two Months Ended July 31, 1917	Two Months Ended July 31, 1918	Per Cent Increase
City Lines Only:			
Passenger revenue.	$2,092,461	$2,394,650	14.45
Full fares.......	2,071,703	2,375,434	14.65
2½ cent fares....	20,757	19,216	*7.47
Revenue passengers	42,264,386	40,359,226	*4.52
Full fares.......	41,434,079	39,590,581	*4.46
2½ cent fares....	830,307	768,645	*7.47
County Lines Only:			
Passenger revenue.	$121,105	$127,774	5.50
Revenue passengers	2,476,392	2,607,455	5.29
Full fares.......	2,367,813	2,498,744	5.53
2½ cent fares....	108,519	108,711	0.11
Entire System:			
Passenger revenue.	$2,213,566	$2,522,425	13.94
Revenue passengers	44,740,778	42,966,681	*3.97

* Decrease.

"The rates of fare would be as follows: In any one zone, including free transfers in that zone, 5 cents. In two zones, including free transfers within two zones, the second rate of fare. In three zones, including the entire city, with free transfers to any part of the city, the third rate of fare.

"We believe that a practicable scheme can be worked out by which passengers may be handled under these new conditions as rapidly and satisfactorily, and the fares accounted for as thoroughly, as under present conditions. This system has many advantages over the present flat-rate system, in vogue in American cities. The short riders are taken care of at the minimum fare and the long rider pays for his ride somewhat in proportion to the cost of providing him with service. This system would also have a good effect in rehabilitating certain decayed portions of the city which have become depopulated on account of unreasonably long hauls now furnished by the company at the expense of those who ride only a short distance.

"It is difficult to predict the financial result of so radical a change. The zone system, first adopted, might produce insufficient revenues, or conversely. A test period of the system proposed should be sufficient to measure the influences on revenues, and provision should be made for a revision at the end of such test period."

Appeals to Mr. McAdoo

International Railway Carries Its Increased Fare Case to the Director General of Railroads

Application has been made to Secretary William G. McAdoo, Director General of Railroads by the International Railway, Buffalo, N. Y., for the government to take over the lines of the company. As the result of the defeat of the company's efforts to collect a fare higher than 5 cents by the voters at the recent fare referendum, the railway is prevented from charging a higher fare within the city limits of Buffalo. In its application to the government, the company points out that it has through freight and passenger tariffs on its interurban lines and also operates part of its system in the Dominion of Canada and should therefore come under the jurisdiction of the Interstate Commerce Commission. The International Railway also operates over the lines of the Erie Railroad and also has through tariffs with other steam railways.

BUFFALO CASE DIFFERENT

Secretary McAdoo is considering the Buffalo situation because it differs from other electric railways, especially in regard to operating across the International boundary line between the United States and Canada. Various legal phases of the problem have been left to the law department of the office of Mr. McAdoo, and after a decision is reached by this department action will be taken by the secretary. E. G. Connette, president of the International Railway, expects a decision will be made by Sept. 22. Various war industries of Buffalo have also petitioned the Director General of Railroads to intervene in the Buffalo case.

Chicago Asks Seven Cents

Application from Elevated Shows $2,447,000 as Estimated Increases in Cost for Year

Due primarily to the tremendous burden imposed by the recent wage award of the War Labor Board the Chicago Elevated Railroads on Aug. 30 filed application with the Public Utilities Commission of Illinois for permission to increase fares on all lines from 5 cents to 7 cents. New passenger tariffs were filed with the application and request was made that the applicants be permitted to "put in effect the schedule of rates on less than the notice required by statute."

WAGES A FACTOR

The petition points out that on June 1, 1918, after voluntary negotiations, an agreement was entered into between the elevated railroads and Division 308 of the Amalgamated Association fixing the conditions of labor and rates of wages to obtain for a period of three years. This agreement provided for an average increase of 3 cents an hour in pay, or about 10 per cent, and applied to all classes in the transportation department and certain classes in the shops and maintainance of way department. The scale of wages thus fixed for trainmen ranged from 31 cents to 41 cents an hour. Due to the unforeseen and extraordinary increases in the cost of living the officials of the union on May 20, 1918, presented to the Mayor and the City Council a petition asking for indorsement of a request to the railway for a wage sufficent to meet living costs and in case the request was denied that the National War Labor Board establish such a wage.

The City Council gave its indorsement and a request was made for an increase in rates of wages of 15 cents an hour, or 40 per cent, over the rates established by the contract of June 1. The management of the elevated railroads while recognizing the fact that the contract of June 1 did not provide an adequate wage advised that with the present fare it was impossible to grant an increase. Application was then made to the National War Labor Board and the company submitted to the jurisdiction of the board. The Board made an award effective on Aug. 1 and for the period of the war fixing the wage scale for trainmen at 44 cents to 50 cents an hour and a minimum wage for other male employees of 42 cents an hour. The amount per annum of the wage increase is more than $1,647,000.

EXHIBIT OF COSTS MADE

The application includes an exhibit showing the cost of electric railway materials and supplies in 1918 as compared with 1915. The total necessary increase in expenditures, including increased material cost, increased taxes, etc., is placed by the company at $2,447,000.

A consolidated income statement for the year ended July 31, 1918, and an estimated statement for the year ended July 31, 1919, is made a part of the application and shows a net loss of $1,752,413 for the latter year. It is stated that although the 7-cent fare would produce a theoretical increase in income of $3,896,370 the estimated increased revenue, due to a decrease of at least 4 per cent in traffic, would be not greater than $2,622,282 if the increase became effective as of Aug. 1, 1918. Exhibit "J," attached to the petition, shows the valuation of the elevated properties as of June 30, 1916, by the Chicago Traction & Subway Commission to be $70,400,916 at present value. Other items not included in this valuation but mentioned in the petition add $10,000,000 to $15,000,000.

The application includes letters of President Wilson and Messrs. McAdoo and Williams emphasizing the value of electric lines in the prosecution of the war and the financial difficulties under which they are now operating. Quotation is also made at length from the recommendation of the War Labor Board as to suggested fare relief for the elevated lines. Exhibit "K" includes a table showing the larger cities in which fare increases have been granted or are pending.

The issue of the ELECTRIC RAILWAY JOURNAL for Aug. 24 noted the request of the Chicago Surface Lines to the City Council for a recommendation so that a petition could be presented to the State Public Utilities Commission "for such an increase in fares as may be necessary to meet existing conditions." The Surface Lines operates under a partnership arrangement with the city and, therefore, wishes the cooperation of the city in its application to the commission. The Elevated Railroads operate under the State railroad act and thus come directly under the Public Utilities Commission.

Yonkers Wants More

A public hearing will be given by the Common Council of Yonkers, N. Y., on Sept. 9, on a petition filed by the Yonkers Railroad for the suspension of its franchise agreements and an increase in fares. The petition, signed by Leslie Sutherland, vice-president, asks that the Mayor and Common Council:

1. Suspend for the period of the war, and one year thereafter, the conditions in relation to rates of fare attaching to the lines of the Yonkers Railroad under any franchise or agreement.
2. Submit the matter of the rates of fare to be charged by the Yonkers Railroad to a determination of the Public Service Commission to increase such rate of fare.

The reason for making the request is that as a result of the war, the increased cost of labor and material makes it impossible for the company to operate cars in Yonkers and adjoining municipalities, according to franchise conditions, at a 5-cent fare.

Zone Studies Begun

Public Service Railway Organizes Special Department to Carry Out Order of New Jersey Commission

A special department has been organized by the Public Service Railway, Newark, N. J., to carry out the order of the Board of Public Utility Commissioners of that State that the company submit by Jan. 1 next "a plan whereby the method of charging now in force may be revised by an equitable zoning system over its entire territory."

Active field work in collecting necessary traffic statistics was started when men began riding the cars and asking passengers to fill out slips which will show the origin and destination of each ride. Every line in the entire system will be covered as speedily as possible and the data secured will be tabulated. So much work is involved, however, that it will be months before it is completed.

PRESIDENT MCCARTER DIRECTING WORK

Preliminary work has been under way ever since the commission's decision was accepted by the company last month. The task is regarded as of such importance that Thomas N. McCarter, president of the company, is personally directing it, he having designated a special committee consisting of General Manager R. E. Danforth, Assistant General Manager H. C. Donecker, General Solicitor L. D. H. Gilmour and General Auditor M. R. Boylan, with himself as chairman, to carry on the work. Dr. Thomas Conway, Jr., of the Wharton School of Finance, University of Pennsylvania, has been retained as a special expert.

A corps of sixty college students has been recruited to collect data. These young men will be supplied with blanks the use of which will, it is expected, enable the company to chart traffic on all lines in such manner as to enable it to lay before the commission the most comprehensive information covering the demands of service and the length of rides of those using the cars, that it is possible to obtain.

The most important phase of the work will consist of securing the basic data upon which any zoning system must be predicated, and as the company is acting under the direction of the commission, it is counting upon receiving the willing assistance of its patrons. All the passengers will be asked to do will be to write on blanks to be furnished them where their journey will end.

As the Essex division has the heaviest traffic, it has been selected as the territory for starting the field work. Other division will be taken up in order until the whole system is covered.

Public Service Needs More

U. S. Shipping Board Explains Vital Need of Adequate Electric Transportation in New Jersey

In connection with the new application of the Public Service Railway, Newark, N. J., for a 7-cent fare, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 31, several federal agencies presented petitions indorsing the company's plea. One of these, that of the Emergency Fleet Corporation of the United States Shipping Board, emphasized with considerable detail the vital interest of the nation in the continuance of adequate electric transportation.

Believing such action to be in the national interest, the Emergency Fleet Corporation requested the Board of Public Utility Commissioners of New Jersey to put into effect such a rate of fare as will provide the Public Service Railway with sufficient funds to pay its operating expenses and maintain its financial stability as a going concern, to the end that it may function at its maximum efficiency as a part of the war-making machinery. The petition was signed by A. Merritt Taylor, Director of Passenger Transportation and Housing, and approved by C. M. Schwab, Director General.

It was pointed out that the government is expending $2,317,105 in advances to the company for necessary additions and extensions to its facilities, and that the company's credit must be maintained in order to permit repayment at the proper time. Furthermore, the company is serving nearly 200,000 of war workers as shown in the accompanying list. For these reasons the petition concluded as follows:

"The transportation service of the Public Service Railway must, at all hazards, be preserved and further increased; the large loans of the United States to this company must be protected and secured; the prosecution of the shipbuilding program and the entire war program must not be delayed or hindered by legal restrictions on this company, which prevent it from earning a fair rate of return and meeting the unusual demands made upon it at this time by the government of the United States."

WAR INDUSTRIES SERVED BY PUBLIC SERVICE RAILWAY

Name	Location	Approximate Number of Employees	
Camp Merritt (one of the largest embarkation camps of the country)	Tenafly	30,000	soldiers
American Can Company	Edgewater and Elizabeth	4,000	employees
Aluminum Company of America	Edgewater	300	
General Chemical Company	Edgewater	700	
Remington Arms Company	Hoboken	2,200	
Crucible Steel Company of America	Jersey City and Newark	9,000	
American Radiator Company	Bayonne	1,000	
General Electric Company	Harrison	3,800	
Federal Shipbuilding Company	Kearny	7,000	
Foundation Company (wooden ships)	Kearny	3,500	
U. S. Army Engineers' Stores	Harrison	600	
Submarine Boat Corporation	Newark	16,000	ultimate
Butterworth-Judson Company	Newark	3,600	
U. S. Army Quartermaster's Station, Port Newark	Newark	3,000	
International Arms & Fuse Company	Newark	12,000	
Splitdorf Electric Company	Newark	1,600	
Balbach Smelting & Refining Company	Newark	1,000	
Thomas A. Edison Company, Inc	West Orange and Bloomfield	7,800	
Westinghouse Electric & Manufacturing Company	Newark and Bloomfield	6,000	
Weston Electrical Instrument Company	Elizabeth	1,000	
Dusenberg Motor Company	Elizabeth	1,000	
Standard Aircraft Corporation	Elizabeth and Plainfield	5,000	
F. S. Moore & Sons Shipbuilding Company	Elizabeth	1,800	
U. S. Army Raritan River Ordnance Depot	Bonhamtown	10,000	ultimate
Union Powder Company	Perth Amboy	3,500	
Parlin Works of the duPont Company	Perth Amboy	6,500	
Nixon Nitration Works	Bonhamtown	600	
Wright-Martin Aircraft Corporation	New Brunswick	4,500	
Standard Shipbuilding Corporation	Shooter's Island (Staten Island)	5,000	
Singer Manufacturing Company	Elizabeth	6,000	
Marconi Wireless Company	Roselle Park	1,000	
John A. Roebling's Sons	Roebling	2,500	
U. S. Army War Department	Gloucester	5,000	
Woodbury (bag filling plant)			
New Jersey Shipbuilding Company			
Pennsylvania Shipbuilding Company	Gloucester	7,000	
New York Shipbuilding Corporation	Camden	11,500	
Under Construction:			
Ford Motor Company (To build government patrol boats)	Newark	5,000	ultimate
Total		190, 000	

Increase Fare One Cent

The application of the Jersey Central Traction Company, Keyport, N. J., for permission to increase its fares from 5 cents to 7 cents and charge 3 cents for each transfer was denied by the Board of Public Utility Commissioners on Aug. 31.

The board decided, however, that the company could file amended schedules providing for a war surcharge of 1 cent added to the 5-cent fare now charged and that transfers be given where they now are given. It was also decided that the new schedule of rates after being filed shall be published to the patrons of the company for three days by notices in the cars, and that the company shall use every endeavor to maintain its operating schedule, especially connections with trains used by the passengers.

The company bases its application on the ground that in 1917 the cost of maintaining and operating its system increased more than 50 per cent over 1916, and will still further increase this year.

It was estimated that the tariffs filed would give $92,000 additional income to the company.

Baltimore Increase Oct. 1

Company There Facing Emergency—Files New Tariff While Awaiting Decision on Previous Appeal

The United Railways & Electric Company, Baltimore, Md., on Aug. 28 filed under the terms of the public service commission law, a revised schedule of rates effective on Oct. 1.

The necessity for taking such action prior to a decision on the petition of the company filed recently with the commission arose from the fact that before such a decision could be had a new increase of wages would go into effect; namely, on Sept. 1. This, apart from and in addition to the increased costs of material and maintenance, will further add to the company's expenses more than $700,000 a year. This increase, when added to the wage raises heretofore given in 1918, will, in the aggregate, place an additional burden of more than $1,700,000 a year on the company, over and above the wage scale existing in 1917, and $2,200,000 a year over and above the scale in 1915, based upon the present service. While the company's gross revenues have increased, such increases have fallen below the increased cost of service. Because of the competing wage rates of the war industries, the wage increases were necessary if the transportation service was to be maintained.

Briefly, the result of the new schedule of rates will be to add 1 cent to the fares now collected from adults, children and commutation tickets. The new rate will also take the place of the 3-cent transfers heretofore sold on certain lines.

The new schedule is of course subject to any action the commission may take on the petition for relief filed previously. It was thought at the time that the previous petition for an advance in rates was filed that the company would be able to stand the financial strain pending a hearing in due course.

Favors Fare Advance

A joint committee of members of the City Council and the Chamber of Commerce of Youngstown, Ohio, has recommended that the fare on the Mahoning & Shenango Railway & Light Company's lines be increased to 6 cents during the period of the war. The Council has submitted the following questions to the city solicitor:

1. Can the city of Youngstown legally pass an amended ordinance granting to the Mahoning & Shenango Railway & Light Company the right to charge a 6-cent fare during the continuance of the war with Germany and six months after the conclusion of peace, without invalidating the present franchise?

2. If this increase should pass would it invalidate the present franchise and when would it take effect?

3. If the present franchise would not be invalidated what legal assurance has the City Council to re-establish the present fare, at the end of the war?

Increase for Milford & Uxbridge Road

Increased fares with some modification from the tariff proposed by the company have been authorized by the Public Service Commission of Massachusetts in an order to the Milford & Uxbridge Street Railway. In August, 1917, the commission authorized the company to increase the unit of fare on all owned lines from 5 to 6 cents, to withdraw existing reduced-rate tickets and to substitute workingmen's tickets at the rate of twenty tickets for $1 good in all zones during certain hours only, in lieu of a cash fare, and to issue tickets good during all hours for ten continuous rides over the two fare zones between Holliston and Framingham.

Failing to realize the anticipated increase in revenue, the company filed a new schedule last June substituting for its present system of irregular and overlapping zones, averaging about 4 miles in length, a mileage zone system on all lines owned, similar to that recently approved for the Boston & Worcester Street Railway. Under this system the road is divided into sections about 1 mile in length and a rate of 2½ cents per zone with a minimum fare of 6 cents for a distance of three zones or less is established. On the leased line of the Medway & Dedham company, the existing fare zones are retained, but the present 5-cent fare unit is increased to 6 cents between Dedham and Medway and to 7 cents between Medway and Franklin. The 5-cent ticket rate through the sale of workingmen's tickets is retained in the proposed schedule, each ticket being good during the same hours in lieu of the proposed 6-cent minimum on all owned lines and in lieu of the 7-cent cash fare on Medway-Franklin line.

The finding rules that workingmen's tickets should be sold at the rate of eighteen for $1 and that tickets for nine continuous rides for $1 should be sold for local passengers between Framingham and Holliston or intermediate points, good only for the original purchaser or members of his family.

Missouri Commission Exceeded Authority

In a verbal decision on Aug. 31, Judge Slate of the Cole County Circuit Court held that the Public Service Commission of Missouri exceeded its authority in permitting the United Railways to charge a 6-cent fare in St. Louis.

The decision was rendered on the appeal to the court by City Counselor Daues, made last June. At the same time Judge Slate held that the Public Service Commission also had no right to grant a 6-cent fare in Kansas City.

Judge Slate's decision covered only one of two points raised by Attorney Daues, acting for the city of St. Louis, who contended that the Public Service Commission had no authority to overrule the contract between the city of St. Louis and the United Railways for a 5-cent fare, and also that a 6-cent fare was excessive. The latter question was not touched on by the court.

When Judge Slate announced his decision, Thomas E. Francis, attorney for the United Railways, and Clyde Taylor, attorney for the Kansas City Railway, were in court. Mr. Francis said the United Railways would apply for a writ of supersedeas, and would offer to file a bond with the court to keep the 6-cent fare in effect until the case could be heard on appeal in the State Supreme Court.

Railway and Stores Co-operate

The Birmingham Railway, Light & Power Company, Birmingham, Ala., awakened to the need of reducing the rush-hour peak, published a series of advertisements on the subject. Aside from the value of the advertisements as such to the company they presented a point of view that immediately won the indorsement of the department stores. In fact, six or seven of the largest stores in Birmingham co-operated with the railway by running in their advertisements an appeal to their customers to finish their shopping by 5 o'clock so that the workers could go to their homes without being crowded by shoppers. One store, Loveman, Joseph & Loeb, in its advertisements said:

"Congratulations, Birmingham Railway, Light & Power Company, on your public spirited attitude of encouraging the customer to shop early."

The store followed this up with a series of editorials in its advertisements commenting further on the efforts of the company.

Louis Pizitz, another large department store in Birmingham, the Burger Dry Goods Company, J. Blach & Son, Goldstein Brothers, Louis Saks and others, also preached "shop early" in their ads.

Columbus Case Up Sept. 5

Federal Judge Sater announced that the case of the city of Columbus, Ohio, against the Columbus Railway, Power & Light Company would be heard before Judge A. M. J. Cochran of Maysville, Ky., in Cincinnati on Sept. 5. Judge Cochran planned to hold court in Covington, Ky., at that time, but announced that he would go to Cincinnati, just across the river, to hear the Columbus case, which relates to the action taken by the railway in increasing its rate of fare.

As noted briefly in the ELECTRIC RAILWAY JOURNAL of Aug. 24, page 350, the company, after having tried for months to induce the City Council to grant a fare increase, served notice of a fare of 5 cents, with 1 cent for each transfer and no rebate. At the same time the company declared its intention to surrender its franchise, and a little later filed suit in the Federal Court to enjoin interference with the operation of its cars. The franchise was surrendered on the ground that it had become confiscatory and deprived the company of its property without due process of law, the company basing its action on the fourteenth amendment to the Constitution of the United States. In the action before the courts the company is seeking to enjoin the city from attempting to enforce the franchise.

Transportation News Notes

Fare Hearing Adjourned.—Chairman Hill of the Public Service Commission for the Second District of New York has adjourned to Sept. 16 the hearing on the petition of the International Railway for a 6-cent fare in the city of Lockport.

Would Return to Federal Rates.—The Salt Lake & Utah Railroad, Salt Lake City, Utah, has appealed to the State Public Utilities Commission again to raise its rate of fare to the schedule adopted when the road assumed that it was under government control.

Montgomery Would Charge Seven Cents.—The Montgomery Light & Traction Company, Montgomery, Ala, has asked for permission to increase fares from 5 cents to 7 cents. The request was made to the City Commissioners, who have taken the matter under advisement.

Investigation at Akron.—Tentative arrangements have been made by the city of Akron, Ohio, with William J. Hagenah, Chicago, Ill., to make a survey of railway conditions in that city with reference to the increase in the rate of fare that has been requested by the Northern Ohio Traction & Light Company.

San Antonio Wants More.—A 6-cent fare or a fare of 5 cents with the abolishment of the transfer system is sought by the San Antonio (Tex.) Public Service Company. Formal application for permission to change the fare was filed with the City Commission recently, over the signature of E. N. Kifer, second vice-president of the company.

P.A.Y.E. for Indianapolis.—The Indianapolis Traction & Terminal Company, Indianapolis, Ind., will make all of its cars pay as you enter, if it gets an increase in the rate of fare sufficient to enable it to do so. Twenty-five pay-as-you-enter cars have been added to the system. It will cost $150,000 to add the pay-as-you-enter feature to the more than 500 cars owned by the company.

Excess Fare Certificate Ordered.—The Conestoga Traction Company, Lancaster, Pa., has been ordered by the Public Service Commission to issue certificates of excess fare to all its patrons and to post notices to this effect in its cars. On Aug. 2, the company raised its fares from 5 cents to 6 cents, and a complainant asked the commission to order the issuance of the certificates.

Long Island Road Increases Wages.—A second increase in wages within the last three months has been granted to the employees of the New York & Long Island Traction Company, Hempstead, N. Y. The latest increase went into effect during the week ended Aug. 30. It ranges from 37½ cents an hour for beginners to 43 cents an hour for employees who have been in continuous service for five years or more.

Scranton-Binghamton Line Increases Fares.—Fares on the Scranton & Binghamton Railroad, Scranton, Pa., will be increased on Sept. 15, according to a schedule of rates and tariff filed with the Public Service Commission of Pennsylvania. The increase affects zones in and out of Scranton, the minimum in Scranton being advanced from 6 to 8 cents, while one-way, round-trip and commutation rates for points over the entire system have also been changed.

Wants Jitneys Regulated.—McCarter & English, representing the Atlantic Coast Electric Railway, have complained to the City Commissioners of Asbury Park, N. J., that the State and local laws regulating the operation of jitneys were not being enforced. Mayor Hetrick has asked the Board of Public Utility Commissioners to make an investigation of the company's complaint and report the same to the City Commission. The City Commission contends that the jitneys are necessary when the railway service fails.

Progress Slow in Memphis.—The City Commissioners of Memphis, Tenn., at a recent session declined to act on the plan advanced by T. H. Tutwiler, president of the Memphis Street Railway, and Charles M. Bryan, attorney for the company, to have the 6-cent fare ordinance prepared, published and brought before the members while the merits of the company's claim were still being threshed out. On the other hand, the commission voted to refer the matter to Lee Goodman, commissioner of public utilities, with instructions to investigate and report back.

New Fast Freight Service.—The Northern Ohio Traction & Light Company, Akron, Ohio, arranged for the operation of a new fast package freight service to connect Cleveland, Akron, Barberton, Wadsworth, Canton, Massillon, Dover, New Philadelphia and Uhrichsville, beginning on Sept. 1. Sixteen freight cars were to be used in the beginning and others are to be added as needed. Dry goods, hardware and boxed merchandise will be handled, but it is believed that the inauguration of the service will also make it possible to ship more farm produce to Cleveland and the other cities than in the past.

Increases for Eastern Wisconsin Company.—The Eastern Wisconsin Electric Company, Sheboygan, Wis., has been authorized by the Railroad Commission of Wisconsin to increase fares on the interurban line operating between Sheboygan and Elkhart Lake, from a ticket rate of 1.9 cents, to 2.9 cents per mile. Increases of practically this same amount have been authorized on the interurban lines of the company between Fond du Lac and Oshkosh, Oshkosh and Neenah, and Oshkosh and Omro, and an increase in the fare from Fond du Lac to North Fond du Lac from 5 cents to 10 cents has also been auauthorized.

Some Recent Pennsylvania Fare Changes.—The Lehigh Valley Transit Company, Allentown, Pa., and the Philadelphia & Western Railway, Upper Darby, Pa., have filed a joint tariff with the Public Service Commission making increases in one-way fares and other rates. The Lehigh Valley Transit Company also has announced 6-cent fares per zone and creation of new zones. The Hanover & McSherrystown Street Railway has gone to a 6-cent fare; the Stroudsburg Traction Company announces changes in rates, while the Easton Transit Company increases regular fares to 6 cents and increases special car fares.

Protest Reduction in Buffalo Service.—A protest has been filed with the Public Service Commission of the Second District by several of the big war industries of Buffalo against the International Railway abolishing all-night car service on all except six of its city lines. This curtailment of owl service, the complaint sets forth, interferes with the transportation of workmen to and from the plants engaged on war work and seriously interferes with early morning travel, as the first morning runs do not start from the carhouses until 5 a. m. Many of the city's car lines are without service until after this time in the morning.

Houston Wants Seven Cents.—The Houston (Tex.) Electric Company will apply to the City Commission for a 7-cent fare, according to David Daly, general manager, in an address before employees of the company. The company recently made application for a 6-cent fare, and the City Commission employed Lamar Lyndon to examine the company's books. In his report Mr. Lyndon said the company had been making sufficient return on its investment and would make ample return this year. Upon this report the City Commission denied the application for a 6-cent fare, but the company asked for a rehearing before the commission. The matter is still pending.

Traffic Survey in Connecticut.—The Connecticut Company, New Haven, Conn., which is now charging a 6-cent fare, is planning to conduct a traffic survey on all of its lines in the State. It will be conducted by college students and others who will ask patrons to answer the usual questions of point of origin and destination. The purpose of the survey is to determine the direction of the present traffic with a view to rerouting and possible fare changes. The survey will be made first on the parts of the system where there is comparatively little summer traffic so as to leave the other lines until later in the year when they will have returned to their standard nine-months' conditions.

Albany Results Disappointing.—According to Harry B. Weatherwax, vice-president of the United Traction Company, Albany, N. Y., the 6-cent fare is not bringing in sufficient revenue to pay the increased expenses of operation due to the raise in pay granted the employees by the War Labor Board. When the increased fare had been in effect a week Mr. Weatherwax was quoted by the Albany *Journal* as stating: "The increase in revenue has been about 10 per cent; we had expected 20 per cent. In fact, the first day's operation showed an increase of only 6 per cent, which rose to 8 per cent on the second day. The three last days of operation showed an increase of about 10 per cent in the amount of the receipts."

Council Favors Fare Increase.—As the result of a petition addressed to the City Council of Galesburg, Ill., in which the company asked that the Council as a whole or by a special committee investigate the condition of the Galesburg Railway & Light Company, go over its books and take some steps either to allow the reduction of expenses or an increase of revenue, a resolution has been passed by the City Council recommending that the company be allowed to advance rates. The application will seek to establish 7-cent single fares, four tickets for a quarter and ten for 60 cents, these rates being suggested in the report of the Council special committee. The application of the company to the Public Utilities Commission for permission to increase fares will accordingly go to that body with a recommendation in its favor from the Council.

Six Cents in Salt Lake.—The Utah Light & Traction Company, Salt Lake City, Utah, has been authorized by the State Public Utilities Commission to charge a cash fare of 6 cents and to sell tickets in strips at the rate of twenty for $1. An estimate made by the commission places the annual increase of income on account of the present order at $134,643, the assumption being that 40 per cent of the passengers carried will pay 6 cents for each fare and not purchase rides at the commutation rate. The increase estimate is based on the traffic of last year. H. F. Dicke, manager of the company, is reported to have said: "The decision is a disappointment to us. We asked for a 6-cent fare with a 5½-cent commutation ticket. According to our closest calculations this will be necessary to offset the $89,000 annual wage increase which went into effect on May 1." In December last the commission handed down a decision authorizing the company from Jan. 1 to discontinue the sale of 4-cent commutation tickets and to charge a straight 5-cent fare.

Personal Mention

S. W. Baker has been appointed purchasing agent of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col., to succeed John F. Esch.

R. A. Clark, formerly treasurer of the Waterbury & Milldale Tramway, Waterbury, Conn., has been elected second vice-president of the company.

C. E. Bostwick, Jr., has been appointed purchasing agent of the Jacksonville Traction Company, Jacksonville, Fla., to succeed F. M. Martzall.

H. G. Mechan has been appointed chief engineer of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col., to succeed M. J. Burgdorf.

O. E. McCormick, formerly assistant secretary of the Middle West Utilities Company, Chicago, Ill., has been appointed assistant treasurer of the company.

Lee M. Reely, who has been welfare superintendent of the United Railways & Electric Company, Baltimore, Md., has entered the United States Naval Reserve Force.

J. W. Dawson, formerly inspector and instructor with the Denver (Col.) Tramway, has joined the instruction department of the Washington Railway & Electric Company, Washington, D. C.

J. H. Ridgely, superintendent of the food depot of the United Railways & Electric Company, Baltimore, Md., since its establishment, has been designated to direct the welfare work of the company, and has assumed the duties of that position.

A. R. Marshall, formerly secretary of the Trinidad Electric Transmission Railway & Gas Company, New York, N. Y., has accepted a position with the Hemphill Manufacturing Company, Pawtucket, R. I., manufacturer of the Banner automatic knitting machines, as assistant secretary and assistant treasurer.

M. J. McDonough, chairman of the central safety committee of the United Railways & Electric Company, Baltimore, Md., has been named to succeed J. H. Ridgely at the food depot of the company. Mr. McDonough will not discontinue his safety work, the scope of which has been so widely extended under his direction, but will undertake to handle both positions.

C. Nesbitt Duffy, vice-president and general manager of the Manila Electric Railroad & Light Corporation, Manila, P. I., and president of the Manila Merchants' Association, was the moving spirit and organizer of an excursion of Manila business men to important cities in the Islands early this summer. Among the cities visited were Ilo Ilo, Zamboanga, Isabela, Jolo, Cebu and San Carlos.

J. R. DAVIES

John R. Davies was appointed assistant to the president of the Philadelphia (Pa.) Rapid Transit Company, effective on Aug. 31. Mr. Davies has been connected with the system in Philadelphia since 1911. He was born in Utica, N. Y. His first railroad experience was obtained during 1893-1894 in Chicago with the World's Columbian Exposition as chief clerk to the superintendent of transportation, handling all foreign and domestic exhibits before the opening of the exposition, during its operation and at the close of the World's Fair. He was paymaster and general timekeeper during the construction of the Wisconsin & Michigan Railroad in 1894. He entered the service of the Chicago (Ill.) City Railway in 1895 and worked in the transportation, mechanical, purchasing and stores department until appointed purchasing agent in 1909. In 1911 he went to Philadelphia from Chicago with T. E. Mitten, president of the Philadelphia Rapid Transit Company, assisting Mr. Mitten in the development and purchase of 1500 near-side cars for the Philadelphia system. In 1912 he was appointed manager of Willow Grove Park and the turnpike under control of the Philadelphia Rapid Transit Company. Mr. Davies is a member of the Rotary and Poor Richard Club and has assisted many committees in bringing important conventions to Philadelphia and in the entertainment of thousands of visitors in the famous Willow Grove Park in that city.

Robert V. Prather, former secretary of the Illinois Public Utilities Commission, at a joint meeting of the Illinois State Electric Association and the Illinois Electric Railways Association, held in Chicago on Aug. 16, was elected joint secretary of the two associations, effective from Sept. 1. Mr. Prather will devote his entire time to the two associations. The headquarters of the associations will be located at rooms 304 and 306 DeWitt Smith Building, Springfield, Ill. Mr. Prather has been secretary of the Public Utilities Commission for the last five years, having been appointed by Governor Dunne a few weeks after the organization of the commission on Jan. 1, 1914. Mr. Prather served through the administration of Governor Dunne and was reappointed secretary by Governor Lowden on July 1, 1917. Prior to his connection with the Public Service Commission of Illinois, Mr. Prather was Western solicitor for a large New York brokerage house.

Obituary

John Edward Bunker, a member of the Public Utilities Commission of Maine, is dead. Mr. Bunker was born in Trenton, Me., in 1866. He was graduated from Boston University in 1892 and was admitted to practice before the Hancock County Bar in October, 1892. Shortly thereafter he opened an office in Bar Harbor. During the administration of Governor Curtis Mr. Bunker was Secretary of State. In 1916 he was a Democratic candidate for Congress in the third district. He was appointed to the Public Utilities Commission last year by Governor Carl Milliken.

Elbert B. Peck, vice-president and comptroller of the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company, died at his home in Indianapolis, Ind., on Aug. 24. Mr. Peck had been ill for about eight months. He was born at Machias, N. Y., in 1860 and was educated in the common schools of New York State. During his early business career Mr. Peck moved to Kansas City, Mo., where he was associated with the Barber Asphalt & Paving Co. In 1899 he became associated with the late Hugh J. McGowan and went to Indianapolis with him where he gained his first electric railway experience, acting as private secretary to Mr. McGowan. In 1900 Mr. Peck was appointed manager of the Broad Ripple Traction Company and when the street railway systems of Indianapolis were consolidated, Mr. Peck had charge of the construction of the terminal building and stations. In 1907 he was elected vice-president and comptroller of the Indianapolis Traction & Terminal Company and also of the Terre Haute, Indianapolis & Eastern Traction Company, which position he held at the time of his death. Mr. Peck was very active in the work of the Central Electric Railway Association and was president of that association in 1911. Funeral services were held in Indianapolis. Interment was at Adrian, Mich.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

Portland, Ore.—The Kenton Traction Company has asked the City Council of Portland for a twenty-five-year franchise to operate its cars over the Derby Street approach to the Interstate Bridge.

Track and Roadway

Petaluma & Santa Rosa Railway, Petaluma, Cal.—Plans for the reorganization of the Petaluma & Santa Rosa Railway, by which the properties ordered sold at foreclosure will be acquired by a new corporation, have been approved by the Railroad Commission of California.

Belt Line Railroad, San Francisco, Cal.—Electrification of the Belt Line Railroad in San Francisco, Cal., has been decided upon by the State Board of Harbor Commissioners, under whose jurisdiction the line operates. The Belt Line runs along the waterfront connecting the various piers with the several railroads that enter San Francisco.

United Railroads of San Francisco, San Francisco, Cal.—To improve the present transportation system and for the convenience of the men employed at the Union Iron Works, the United Railroads of San Francisco is constructing a pay-as-you-enter station and loop system at Eighteenth and Kentucky Streets. The new station will include six tracks in the loop and will, it is believed, handle the full force of the works without delay or congestion.

Stockton (Cal.) Electric Railway.—Work has been begun by the Stockton Electric Railway on the reconstruction of its lines on South San Joaquin Street through the Homestead district. The cost of the work is estimated at $30,000.

Connecticut Company, New Haven, Conn.—The Connecticut Company has borrowed through the United States Housing Corporation approximately $1,350,000, at interest, to provide funds for constructing tracks to take care of munition workers in the city of Bridgeport and to purchase one-man safety and other cars as announced elsewhere. The title to the cars and additional track facilities will remain in the housing corporation's name until full payment has been made by the company. The exact location and dimensions of this track work have not yet been definitely decided upon, but one of the plans contemplates double-tracking a street parallel to the main street which is greatly congested, and the building of a terminal station with the necessary loops and through tracks reasonably near the center of the city.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The New York, New Haven & Hartford Railroad, for the present at least, has abandoned the plan of double-tracking the electric railway between Warren and Fall River. Sections of the railway were double-tracked, but the rails laid are now being removed to other sections of the system for use. This action is said to be due to the scarcity of steel for rails. As soon as possible the company will return to its original plan of double-tracking the entire railway.

***Gulf Ports Terminal Railroad, Pensacola, Fla.**—Efforts are being made to obtain the approval of the United States Railroad Administration for the completion of the Gulf Ports Terminal Railroad from Pensacola to Mobile, this line being an extension of the Pensacola, Mobile & New Orleans Railway. Track has been laid to a point within 18 miles of Mobile Bay and on the unfinished portion the roadbed has been graded and the bridges built. About $500,000 is required to lay the track and put the road in operation. It is proposed to seek $400,000 from the War Finance Corporation, while $100,000 is to be raised locally. The use of electric passenger cars is being considered. E. McLaughlin, president.

Lincoln (Ill.) Municipal Railway.—Plans are being considered for the reconstruction of the lines of the Lincoln Municipal Railway.

Anaconda Copper Mining Company, Anaconda, Mont.—An extension will be built by the Anaconda Copper Mining Company from the present terminal to the zinc plant, about 1 mile. The extension passes over a hill that makes an engineering problem of some size, and the estimated outlay is $50,000.

Boston & Maine Railroad, Portsmouth, N. H.—Plans have been made by the Boston & Maine Railroad for the construction of an extension from Dennett Street to the plant of the Atlantic Shipbuilding Corporation at Freeman's Point.

Interborough Rapid Transit Company, New York, N. Y.—Residents of Brooklyn have presented a petition to the Public Service Commission for the First District of New York asking for an extension of the Nostrand Avenue branch of the Eastern Parkway subway to Manhattan Beach, over the tracks of the Long Island Railroad. The Commission has referred the petition to its legal department.

Texas Electric Railway, Dallas, Tex.—Work is under way by the Texas Electric Railway on the construction of a line from Twenty-eighth and Lasker Streets into the Army Replacement Camp, about 1¼ miles.

Blue Ridge Light & Power Company, Staunton, Va.—Amendments have been made to the charter of the Blue Ridge Light & Power Company, changing the name of the company to the Shenandoah Traction Company.

Monongahela Valley Traction Company, Fairmont, W. Va.—Plans are being made by the Monongahela Valley Traction Company for a $2,500,000 loan to be used to complete work under way, including the Rivesville power plant, gas-producer plant, gasoline plant, drilling gas wells, laying gas mains, paving, extending transmission lines, developing coal land, sinking two shafts for mines, and the construction of twenty-five houses.

Shops and Buildings

Southern Pacific Company, San Francisco, Cal.—The Southern Pacific Company contemplates the erection of new shops in Roswell, N. M., to cost between $75,000 and $100,000.

Connecticut Company, New Haven, Conn.—The Connecticut Company plans to build a terminal station in Bridgeport, near the center of the city. This will be built on a so-called "plaza," ground space for which will be provided by the demolition of many old buildings by the city. Included with the terminal building will be pay-as-you-enter inclosures for car patrons.

Power Houses and Substations

West Penn Power Company, Connellsville, Pa.—According to an announcement made by the officials of the West Penn Power Company, controlled by the West Penn Railways, a new power plant will be erected on the Allegheny River at Freeport, at a cost of about $5,000,000. The proposed plant will have an output of 40,000 kw., and will provide power for essential industries of the district doing war work for the government. Of the necessary capital the government has agreed to advance $2,000,000. The plant will be in charge of the government, which will specify the distribution of the power.

Rutland Railway, Light & Power Company, Rutland, Vt.—A contract has been placed by the Rutland Railway, Light & Power Company with the Rutland Railroad for the supply of additional power to the amount of about 500 hp. for the operation of the new shops now in course of construction.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS
FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES · MARKET QUOTATIONS · BUSINESS ANNOUNCEMENTS

Inventory of Steel Stock To Be Taken

The Government Census Bureau Is Sending Questionnaires to All Manufacturers Asking for Reports

A country-wide inventory of stocks of steel on hand is being made by the War Industries Board at the instance of its chairman, Bernard M. Baruch, in co-operation with the Census Bureau of the Department of Commerce. The ascertainment of the supply of steel is of first importance in view of the deficiency of production of steel for direct and indirect war needs.

The present estimated total production of steel in sight is 17,000,000 tons, and war demands total more than 23,000,000 tons, with the demand constantly rising. In a recent interview with the Washington newspaper correspondent, Mr. Baruch announced he could not approve requests for an ounce of steel for domestic uses, because of the imperative need of meeting the war demands.

The Census Bureau through its census-taking organization, is sending questionnaires to more than 40,000 manufacturers in this country asking complete reports of stocks of steel on hand, down to the smallest holdings. It is sought to reach every manufacturer who uses steel in any way and in any amount in his industry. Cheerful compliance with the government's plan to inventory the stocks on hand is confidently expected by the War Industries Board, because of the win-the-war need that prompts the step and because of the general character of the inquiry.

A number of industries—such as the automobile industry—have been called upon to report stocks of steel on hand that the War Industries Board may be guided in making an intelligent administration of the steel stocks. Mr. Baruch decided, however, it was necessary to gather complete information from all steel-using industries and the War Industries Board determined on a general inventory from all manufacturers.

EFFECT ON RAILWAY INDUSTRY

The effect that this may have on the electric railway industry is largely dependent on how vital the government considers the electric railways in carrying out its war program. There may be certain lines that are not considered essential, and repair and maintenance parts of steel would undoubtedly be cut off from such lines. Manufacturers of electric railway apparatus feel that any stock of steel that they may have on hand for future use with electric railway equipment cannot be used to greater advantage to the government than by supplying the most urgent present needs of roads requiring this equipment.

Steel manufacturers state that they will follow government orders implicity and will roll only such shapes and manufacture only such steel parts as are approved by the authorities. No shipments will be made unless orders are accompanied by priority certificates or affidavits showing the essential use that will be made of the material.

This is in accordance with instructions issued to steel manufacturers by the government some time ago, and it has been followed since then.

Contract for 36-Mile Signal System Awarded

The Washington, Baltimore & Annapolis Electric Railroad has recently contracted with the Union Switch & Signal Company for block signaling to be installed over its double-track line between Naval Academy Junction and District Line, near Washington. This is a second section of signaling to be recently undertaken on the main line of this road between Washington and Baltimore, the first, between Naval Academy and Baltimore, having already been placed in service.

This new signaling will protect 36 miles of track and thirty-seven switches with twenty blocks on a headway of approximately three minutes under caution and six minutes under clear signals. The signaling has been laid out to reduce this running time one-half by the later addition of intermediate signals when future traffic warrants.

The apparatus will be similar to that employed in the first installation involving continuous alternating-current track circuits, style "N" color-type light signals mounted on iron pipe posts and Model 15 vane relays. Light-type switch indicators with push-button attachment will be used at all switches. Power at 2200 volts and 25 cycles will be secured from the railroad's power system at Naval Academy Junction.

General Electric Prospects for Current Year

Orders Running at Annual Rate of $250,000,000—Large Business from Government for Turbines

Current orders of the General Electric Company are running at the annual rate of $250,000,000 against a rate of less than $240,000,000 for the corresponding period last year, according to the *Wall Street Journal.* Bookings for the full year 1917 aggregated $246,778,491 and the amount by which they surpassed the rate up to this time last year bids fair to be equalled in the calendar year. In any event, it would not be surprising if the volume of sales billed in 1918 should reach the $225,000,000 mark against $196,926,318 in 1916.

Attainment of $250,000,000 total bookings in 1918 would establish a new high mark for the third successive year. Record 1917 bookings of $246,778,491 bettered the 1916 total by 45 per cent; they were 120 per cent larger than those of 1913 and 1764 per cent larger than those of 1896.

In the following table comparison is made for a number of years of bookings, billings, cost of sales and percentage of cost to gross.

According to the *Wall Street Journal* the percentage cost of sales of 85.2 per cent in 1917 was the lowest in many years. The percentage cost of sales in the last five years, including depreciation charges, has been about stationary and the average for the period is 88.7 per cent. This profit of 11.3 cents on the dollar compares with a profit of 14.1 cents in the year 1906 and 7.9 cents in 1896.

Year	Bookings	Billings	Cost of sales	P. C. cost to gross
1917	$246,778,491	$196,926,318	$167,921,778	85.2
1916	167,169,058	134,242,290	118,984,199	88.3
1915	98,385,891	85,522,070	76,898,182	89.9
1914	83,748,521	90,467,692	81,496,728	90.0
1913	111,819,142	106,477,438	96,207,833	90.3
1912	102,934,788	89,182,185	81,074,192	90.9
1906	50,044,272	43,146,902	37,025,346	85.9
1896	13,235,016	12,730,058	11,759,857	92.1

Manufacturing and labor costs being higher, it is probable General Electric this year will report a smaller percentage of net. As compared with 85.2 per cent in 1917, ratio of manufacturing costs and interest charges to sales billed will probably be not less than 88 per cent this year. Applying this percentage to the estimated total of $225,000,000 sales billed would give $27,000,000 net, to which must be added "other income" last year amounting to $4,512,290, or $31,512,290 in all. Profits for the current year are estimated at $26,000,000.

An outstanding feature of company's financial position, it is pointed out, is its greatest strength of working capital. Cash on hand at the close of 1917 was $21,190,675, as against $12,167,707 at close of 1916. Total quick assets as of Dec. 31, last, were $154,549,251. Current liabilities aggregated $20,907,746, leaving working capital of $133,641,505, or $131.6 per share, as compared with $83,179,120, at the end of 1916.

The company has subordinated regular business to the government's needs. A substantial part of its present production consists of turbines for merchant ships and war vessels. The company has a blanket order from the government to turn out as many turbines and as much electrical equipment as its facilities will permit, so that with ordinary business accumulating, capacity operations at all plants of the company are assured for an indefinite period.

Car Equipment Market Conditions

Manufacturers In Position to Take Care of More Business — No Evidence That Prices Will Fall So Long as War Lasts

Broadly speaking, electric railways in that part of the country subject to severe winter conditions are in need of much new car equipment as the summer closes. Many of the roads in the North have not fully recovered from the strain the extraordinarily rigorous weather of last winter put upon their rolling stock. During the summer a good deal of important work has been done in the way of stocking up with spare parts against emergency conditions which may arise in the coming winter. One New England road, for example, has purchased about $50,000 worth of railway motor coils, and on the whole, the railway properties in that section are reasonably well supplied with this kind of material as the result of forehanded buying following the late winter severities. So far as spare motors go, however, few roads are in a position to feel over-confident as to their service maintenance in case the coming cold months force temporary withdrawals of equipment on a large scale. There is no question that companies with a fair-sized motor reserve made a much better showing and lost far less money from interrupted schedules last winter than did those which ran close to the wind, so to speak, in the matter of spare units.

The manufacturers are at present in a position to take care of a good deal more motor and control equipment business than is on the books. Some large orders are being handled, but in general, buying has been retarded by rather unsatisfactory credit conditions leading out of inadequate net earnings.

Motor and control equipment can be delivered from the factory in about three months at present, given the necessary priority order; and ordinary quotations run from four to five months. Despite the pressure of war orders upon the great majority of manufacturers, space is still available for the increased production of motors and other car equipment.

In conformity to the government's desires, very little stocking up is at present being done as regards equipment using large quantities of steel, copper and insulating material at the factories. It would be helpful to the manufacturer and to the operating companies as well if motor and accessory orders could be placed as far ahead of actual needs as possible, instead of waiting until the pressure of an unbearable operating situation inscribes the operating company manager's name upon the familiar dotted line. Motors are now being produced in considerable numbers for use on one-man cars, but there is still room for a much wider appreciation of the economic value of such equipment from the standpoint of merchandising transportation service.

Few managers indeed would contend at this time that they have no serious equipment needs. The question of means is the most important one in relation to the provision of new apparatus. Operating expenses have gone to unprecedented levels, and it is undeniable that the long-continued use of old rolling stock and motors has in many cases run unit costs up beyond former standards as well as increased platform expenses. There is a very close connection between the quality of service offered the public and the securing of sufficient revenue to maintain an adequate equipment reserve. There is a recognition in the industry that more frequent service must be offered on many lines in order to stimulate short-haul patronage, and with the drain the war is making upon the repair shops, a larger reserve in rolling stock or at least in motors and electrical apparatus used on the cars is needed.

The essential character of electric railway service in communities containing munitions plants, shipyards, arsenals, etc., has been recognized by the government and a considerable amount of buying on behalf of such properties has been a feature of the equipment market of late. On such roads, at least, the hand-to-mouth policy in purchasing car equipment has given way to a consistent development of the market along the lines of war necessity.

While no immediate advance in the price of car equipment is in sight, in view of the close control of the government over the prices of materials entering into such products, the cost of labor appears to be tending upward, and in manufacturing circles the opinion is voiced that there is little use in deferring the purchase of equipment because at some later date prices may go considerably lower than at present. So long as the war lasts and indeed for some time thereafter, it is more probable that prices will run nearer present levels than much below them. Experienced observers of market conditions are emphasizing the fundamental need of electric transportation and the corresponding economic demand for more equipment. This must be met through equipment trusts or some other suitable financing, and it is advantageous for the operating companies that the manufacturers are in as good a position as at present appears to be the case to handle orders for new and reserve car equipment.

Coal Production Recovers From Slump

Total Production for Year to Date Is 869,000 Tons or 2.17 per Cent Over 1917

Recovery from the slump of the past five weeks marked the production of bituminous coal during the week ended Aug. 24, according to the weekly report of the Geological Survey. The output during that week (including lignite and coal made into coke) is estimated at 12,603,000 net tons and not only exceeded the production during the week preceding by 669,000 net tons, or 5.6 per cent, but exceeded the production during the past three weeks. Production during the current week of 1918 was 1,852,000 net tons, or 17 per cent in excess of the production during the corresponding week of 1917.

The average production per working day during the week of Aug. 24, is estimated at 2,100,000 net tons, as against 1,989,000 net tons during the week preceding, and 1,792,000 net tons during the week of Aug. 24, 1917.

ANTHRACITE PRODUCTION UP

Production of anthracite in the United States during the week of Aug. 24 is estimated at 2,134,000 net tons, as against 1,924,000 net tons during the week preceding, an increase of 10.9 per cent, and as against 1,988,600 net tons during the corresponding week of 1917, or an increase of 7.3 per cent. The average daily production during the week of Aug. 24 is estimated at 355,667 net tons, as against 336,839 net tons during the coal year to date, and as against 329,831 net tons during the same period of 1917.

Total production for the coal year to date is estimated at 41,768,000 net tons, an increase over 1917 of 869,000 net tons, or 2.1 per cent.

The anthracite industry, according to *Anthracite News*, goes into the fall with no storage coal and orders far in excess of current producing capacity.

More coal could be produced if the labor power could be increased. The anthracite mine-workers' army has been reduced 80 per cent since the war began. That this has not prevented a record output is because of every mechanical apparatus and washing operations that is being employed to overcome this handicap.

Rolling Stock

Connecticut Company, New Haven, Conn., will purchase from the American Car Company, St. Louis, Mo., twenty one-man cars, permission for the purchase of which was announced in last week's issue of the ELECTRIC RAILWAY JOURNAL. These cars will be 27 ft. 9½ in. over all in length and 8 ft. in. width. The height from the rail to the top of the roof will be 9 ft. 9⅝ in. The platform floor will be on the same plane as the body floor, and folding doors and steps will be provided. The cars will have two-motor equipment, with air brakes and all modern safety features. The total weight will be 5 tons. The company will also purchase fifty interurban cars of the Connecticut Company's standard dimensions, the length being 48 ft. 2 in. over all. The seating capacity of these cars will be fifty-six, and they will be equipped for double-end operation. The total weight will be 24 tons.

Trade Notes

Chicago (Ill.) Pneumatic Tool Company announces the appointment of C. W. Cross as special representative for the sale of pneumatic tools to railroads, succeeding L. C. Sprague, promoted to be district manager of sales for the company at New York.

Vulcan Steel Products Company, Inc., 120 Broadway, New York City, has made the following announcement: Governmental restrictions concerning house organs and the urgent need for the conservation of labor and material render it advisable to discontinue the publication of *Vulcan*. The August issue—which we have striven to make our best edition—will be the last *Vulcan* during the period of the war.

Page Steel & Wire Company annual meeting resulted in the election of Norman Bridge to the board to fill the vacancy created by the death of the late Austin Clement. The board organized by electing the following officers: B. Lissberger, president; A. A. Clement and J. N. Podrasnik, vice-presidents; A. B. Cody, secretary; J. E. Carr, assistant secretary and assistant treasurer; J. N. Podrasnik, treasurer, and E. C. Sattley, general manager. Dividends were declared from the profits in the period from Jan. 1, 1918, to July 1, last, as follows: $3 a share on the first preferred stock and $3.50 a share on the preferred stock, payable on Oct. 31 to stock of record as of Oct. 15. The net profits before taxes for the year ended June 30, 1918, were $420,556. It was stated after the meeting that the company had $4,000,000 of unfilled orders on its books.

New Advertising Literature

Walter A. Zelnicker Supply Company, St. Louis, Mo.: Bulletin No. 247, descriptive of locomotives, cars, trucks, shovels, ditches, skidders, loaders and machine tools.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: Catalog 3-B, dated June, 1918, a very comprehensive bulletin on switchboard, portable and precision instruments, meter shunts, instrument transformers and relays.

Jeffrey De Witt Insulator Company, Huntington, W. Va.: Catalog No. 2, describing and illustrating its high-tension disk insulators. Illustrations are produced which show the effect of high-frequency tests on these insulators at 600,000 volts and 10,000 cycles. High-frequency tests are also shown with Corona effects top and bottom at 110 kv. and the flashover in air at 125 kv. These insulators are also shown in strain. Substations equipped with the "JD" insulators and transmission lines are also produced.

NEW YORK METAL MARKET PRICES

	Aug. 28	Sept. 4
Copper, ingots, cents per lb	26	26
Copper wire base, cents per lb	29.25	29.25
Lead, cents per lb	8.05	8.05
Nickel, cents per lb	40	40
Spelter, cents per lb	9.00 to 9.25	9.50
Tin, Chinese*, cents per lb	90 to 90.5	....
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

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* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Aug. 28	Sept. 4
Heavy copper, cents per lb	23.50 to 24.50	23.50 to 24.50
Light copper, cents per lb	20 to 21.50	21.00 to 21.50
Red brass, cents per lb	22 to 23	23.50 to 24.50
Yellow brass, cents per lb	13¾ to 14½	16.00 to 16.75
Lead, heavy, cents per lb	7.50 to 7.75	7.50 to 7.75
Zinc, cents per lb	6.75 to 7.00	7.50 to 7.75
Steel car axles, Chicago, per net ton	$41.52	$41.52
Old carwheels, Chicago, per gross ton	$29.00	$29.00
Steel rails (scrap), Chicago, per gross ton.	$34.00	$34.00
Steel rails (relaying), Chicago, gross ton.	$60.00	$60.00
Machine shop turnings, Chicago, net ton.	$16.25	$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	Aug. 28	Sept. 4
Rubber-covered wire base, New York. cents per lb	30 to 37	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40	32.40 to 36.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	35.00 to 37.72	35.00 to 37.72
T rails (A. S. C. E. standard), per gross ton	$70.00 to $80.00	$70.00 to $80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$67.50	$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$62.50	$62.50
T rail, high (Shanghai), cents per lb	4¼	4¼
Rails, rdger (grooved), cents per lb	4¼	4¼
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	*3¼	*3¼
Tie plates (brace type), cents per lb	*3¼	*3¼
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	*3¼	*3¼
Angle plates, cents per lb	*3¼	*3¼
Angle bars, cents per lb	*3¼	*3¼
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35

	Aug. 28	Sept. 4
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount†	80%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	77%
Car window glass (double strength, all sizes AA quality), New York discount	82 & 3%	79%
Waste, wool (according to grade), cents per lb	11½ to 22	11½ to 22
Waste cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	$38.50	$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$42.50	$42.50
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.86	$1.90
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.88	$1.92
White lead (100 lb. keg), New York, cents per lb	10½	14
Turpentine (bbl. lots), New York, cents per gal	63	65½

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* Government price. † These prices are f. o. b. works, with boxing charges extra.

In Cold and Wet–
PEACOCK BRAKES

When cold weather comes again with its snow and sleet are you going to depend entirely on your air-brakes? Have you forgotten last winter, when car after car was laid up owing to frozen air?

Buffalo winters are severe; but you will find even the newest of new cars, the "Peter Witt," equipped with Peacock Brakes.

A material **reduction** in your accident account and a material **increase** in your service reliability are sure rewards for using the Peacock.

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The quickest and simplest way is by the use of a Lincoln Bonding Machine.

Any and all kinds of metallic and carbon welding made easy.

The Lincoln Bonding Machine is the lightest and most efficient machine today.

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Under the Ohmer System, it is decidedly to the conductor's advantage to *collect* the fare, to collect the *right fare,* and to *register* the fare *correctly*. If for any reason the fare is not registered, the conductor is constrained to turn it in anyway, and you have *knowledge of the fact that it was not registered.*

The publicity which surrounds each transaction is such that irregularities on the part of both passenger and conductor are reduced to a minimum. If there *are* any irregularities, they are soon understood through the method of merit analysis made possible by the Ohmer System and the proper discipline can be applied.

The Ohmer System consists of the most successful ideas of modern business applied to the conservation of the receipts of electric railways.

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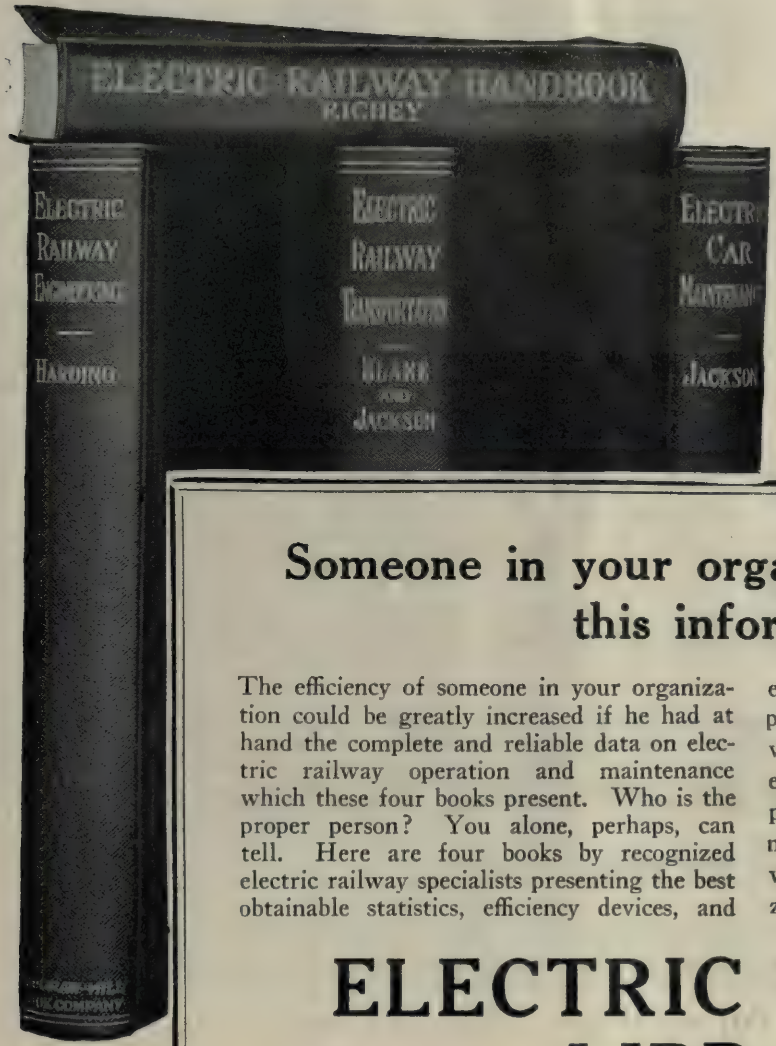

Give us his name—

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The efficiency of someone in your organization could be greatly increased if he had at hand the complete and reliable data on electric railway operation and maintenance which these four books present. Who is the proper person? You alone, perhaps, can tell. Here are four books by recognized electric railway specialists presenting the best obtainable statistics, efficiency devices, and engineering methods, with reports and comparisons of different systems. They are valuable. They are helping hundreds of electric railway executives in meeting the perplexing new demands of the day. Why not look the books over and see for yourself what they are and decide who in your organization should use them?

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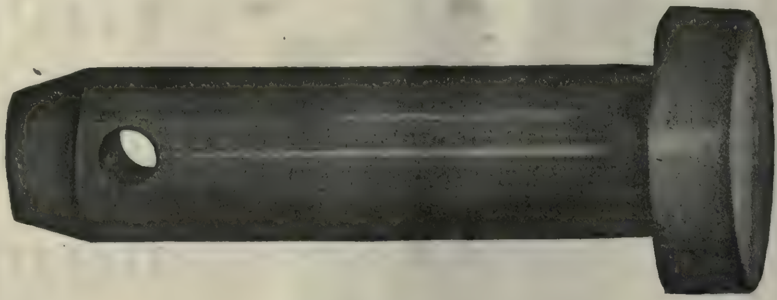

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The W. B. & A. is the busiest interurban going these days because of the great travel due in big part to business from Camp Meade and Annapolis.

Nothing less than trains will do; and they are certainly obliged to make the mileage.

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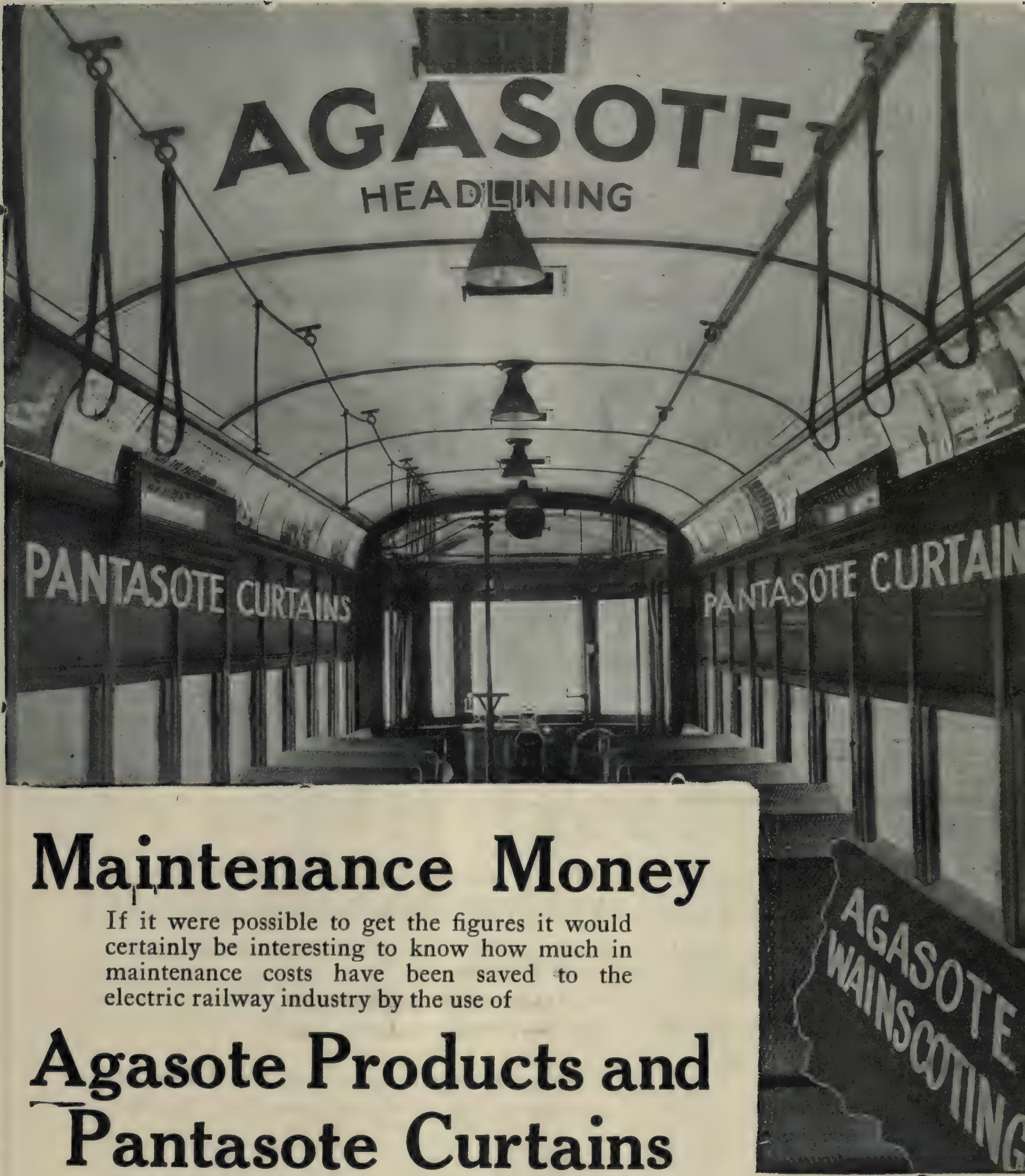

Maintenance Money

If it were possible to get the figures it would certainly be interesting to know how much in maintenance costs have been saved to the electric railway industry by the use of

Agasote Products and Pantasote Curtains

It would surely total up to a very tidy sum.

The old style wooden roof with its covering of white lead and canvas had to be repaired at intervals to keep it waterproof.

In the event of accident repairs were a tedious and costly process.

AGASOTE is absolutely waterproof to start with and it stays that way.

In event of accident it is *easily* and *rapidly* patched.

The old-fashioned lattice shutters used for car wind had to be kept painted or varnished. The slats got bro and had to be replaced.

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PANTASOTE CURTAINS have only to be washed to b good as new.

No wonder that AGASOTE and PANTASOTE have bec standard for the purposes for which they are used.

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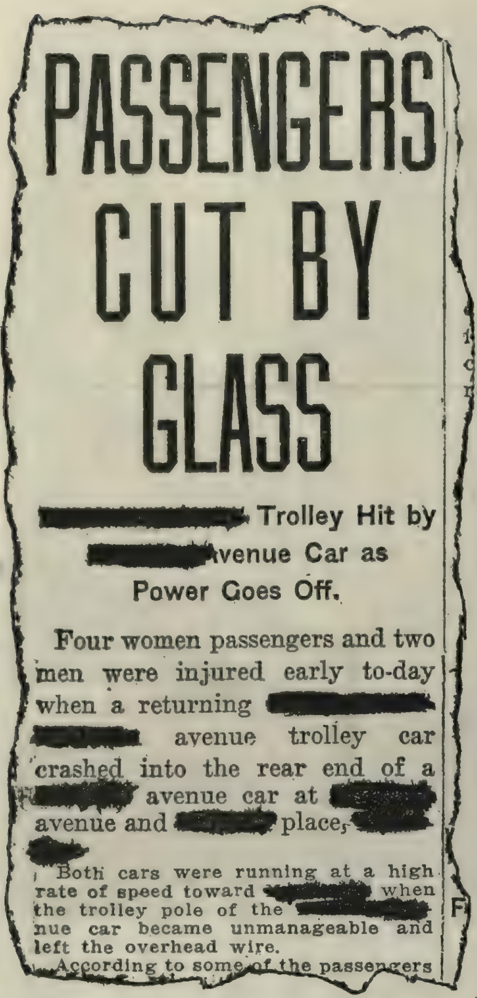


PASSENGERS CUT BY GLASS

[redacted] Trolley Hit by [redacted] avenue Car as Power Goes Off.

Four women passengers and two men were injured early to-day when a returning [redacted] avenue trolley car crashed into the rear end of a [redacted] avenue car at [redacted] avenue and [redacted] place, [redacted]

Both cars were running at a high rate of speed toward [redacted] when the trolley pole of the [redacted] nue car became unmanageable and left the overhead wire.

According to some of the passengers

The Miller Trolley Shoe would have prevented this accident

To attempt to make high speed with the ordinary revolving trolley wheel is inviting accident. Service of this kind demands Miller Trolley Shoes, which hug the wire under any condition of speed, wind or weather.

Miller Trolley Shoes work at a much lower tension than trolley wheels, which means less wire wear and breakage.

A few of the benefits of sliding contact are:

No smashing down of overhead. No arcing at spans or burning of trolley wire. No bent poles or bruised car roofs and no traffic interruptions due to dewirement.

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

SALES REPRESENTATIVES:

Alfred Connor,
Denver, Col.

T. C. White & Co.,
St. Louis, Mo.

S. I. Wailes,
Los Angeles, Cal.

F. F. Bodler,
San Francisco, Cal.

W. F. McKenney,
Portland, Oregon.

W. M. McClintock,
St. Paul, Minn.

Nevasplit Headlining

On the hundred new cars that serve the workers at Hog Island

And still another link is added to the long chain of NEVASPLIT cars.

NEVASPLIT is used on the 100 cars ordered through the Emergency Fleet Corporation for operation by the Philadelphia Rapid Transit Co. to the Hog Island Shipyards.

NEVASPLIT will not shrink or warp, "check" or split. It is waterproof and of minimum conductivity. And it will add safety and beauty to your car interiors, either as headlining insulation roofs or as interlining.

If you are not familiar with all the many qualities of NEVASPLIT, how it positively insures a saving in money, we will gladly send samples and descriptive bulletins.

Write for full particulars.

The Keyes Products Company

120 Broadway, New York

NEW YORK
W. R. Kerschner Co., Inc.
50 Church St.

SAN FRANCISCO
Ford & Geirrine
Merchants' Exchange Bldg.

Columbia Trolley Wheels For Every Kind of Weather

OUR splendid foundry facilities enable us to turn out perfect trolley wheels by the thousands at moderate prices.

In addition to our standard solid trolley wheels for general service, we direct your attention to the

Columbia Sleet Cutting Wheel

The ideal trolley wheel for insuring uninterrupted collection of current during the prevalence of hail, sleet, snow or ice. Does its work effectively without the aid of auxiliary sleet-cutting devices. **Beat Winter to it,** by ordering your Columbia sleet wheels now!

Columbia trolley wheels of both types in diameters of 4-in., 5-in. and 6-in. are in stock ready for immediate shipment. You can meet many other of your wants by ordering from this general list of Columbia products.

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd., Toronto, Ont.

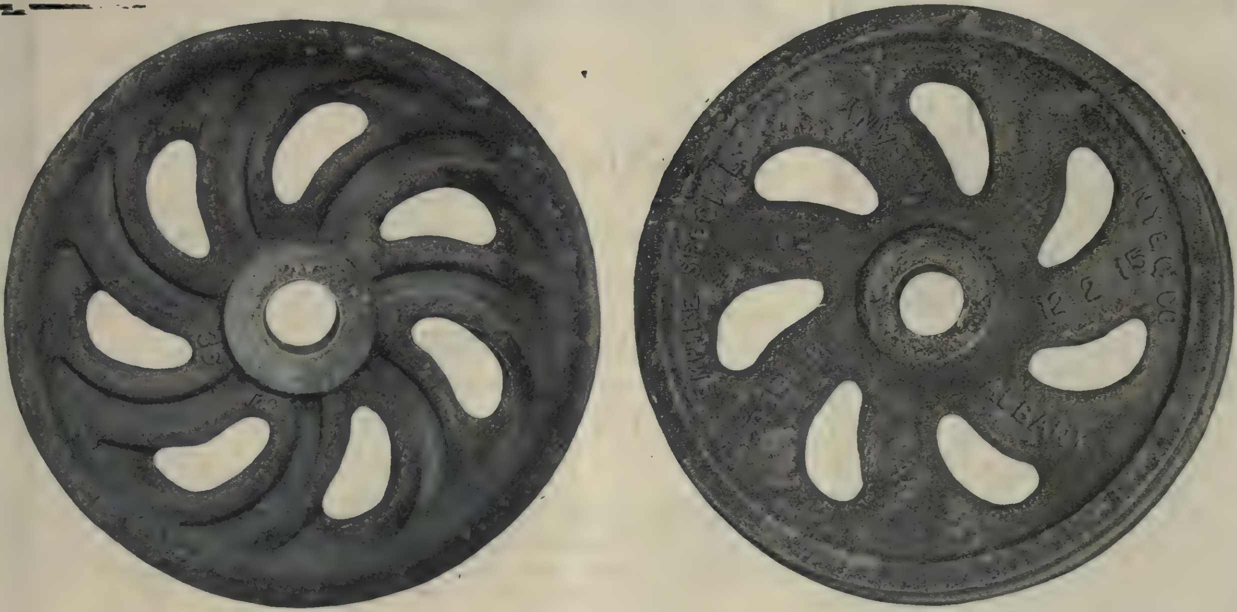
TOOLS

- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

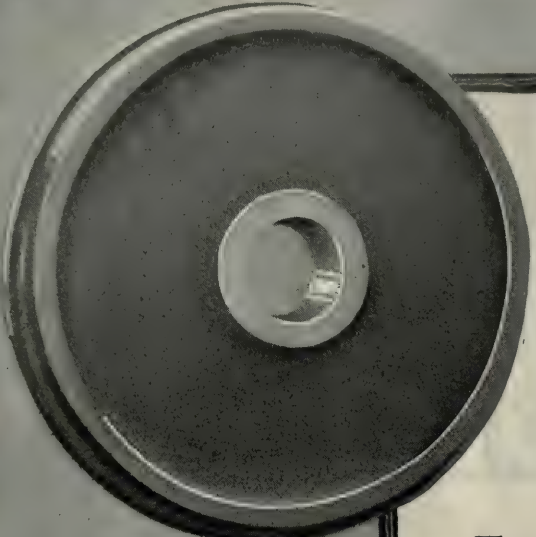
- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

Choose
EMPIRE SPECIAL
Chilled Tired, Cast Iron WHEELS



Chilled Iron Wheels are the choice of ninety per cent. of the street car companies, operating one hundred or more cars, in one hundred cities of the United States and Canada. Our Empire Special Wheel is considered by experts the best wheel on the market. Ask us for prices.

W. R. Kerschner Co., Inc.
50 Church Street, New York



Standard for 67 Years

The Chilled Iron Wheel has performed its every function at a minimum cost.

For Freight Cars

95% of all cars in this type of service are carried on Chilled Iron Wheels.

For Street Cars

The Chilled Iron Wheel is Standard for Street Car Service in 95 out of 100 cities in the United States and Canada, operating 100 cars or over.

The Conclusion

to be gained from these figures is that the Chilled Iron Wheel gives the Greatest Service for the Lowest Cost.

The Wonderful Single-Service Chilled-Iron Wheel

Association of Manufacturers of Chilled Car Wheels
1229 McCormick Building, Chicago, Ill.

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per Day.

OKONITE

TRADE MARK
REG. U. S. PATENT OFFICE.

The Standard for Rubber Insulation

Railway Feed Wires insulated with OKONITE are unequaled for flexibility, durability, and efficiency and are in use by the leading Electric Street Railway Companies. OKONITE is preferred above any other insulation for Car Wiring, Telegraph and Telephone Purposes.

OKONITE WIRES—OKONITE TAPE
MANSON TAPE—CANDEE WEATHERPROOF WIRES
CANDEE PATENTED POTHEADS

Samples and Estimates on Application

THE OKONITE COMPANY, 501 Fifth Ave., cor. 42nd St., New York

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass

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You Can Minimize Overhead Repair Work

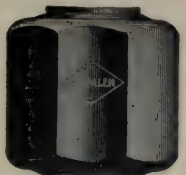
and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

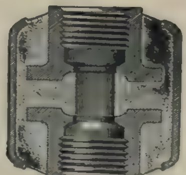
It will pay you to write for information and prices.



The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?



TRADE MACALLEN MARK

The Macallen Company

Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK

ELECTRICAL WIRES
AND CABLES

IRON, STEEL AND
COPPER WIRE ROPE
AND WIRE

TROLLEY WIRE INSULATED WIRES TRANSMISSION WIRE

Galvanized E. B. B. and B. B. Telephone and Hard Drawn Copper for Telephone Lines. Bronze and Galvanized Steel Contact Wire. Galvanized Strand for Guys, Span Wire and Messengers.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY

Agencies and Branches: New York Boston Chicago Philadelphia Pittsburgh Cleveland
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The Demonstrated Service Value
of
Colonial Copper Clad Steel Wire

TRADE C.C.C. MARK

is due to the perfection and continued supremacy of weld between the copper and steel, and an expert knowledge of and skill in the production and uses of high grade electric wire and cable products. For over 10 years C.C.C. Wire has maintained its supremacy.

UNITED STATES GOVERNMENT THRIFT CARD
UNITED STATES OF AMERICA WAR-SAVINGS CERTIFICATE

You
can hit
the Hun
and help
yourself
by buying
early and often.

Colonial Copper Clad Wire has been produced continuously for a longer period and in larger quantities than the combined quantities and periods of manufacture of all other past or present competitive products. It has stood the "test of time" in service tests and unbroken continuity of manufacture as no other wire has done.

For further information, write for Bulletin 202.

Standard Underground Cable Co.
Pittsburgh, Pa.

Branch Offices in All Principal Cities.

Can You Name a Better Insurance than

They Free You From All Liability

Some Linemen are bound to get careless and work without gloves around supposedly "dead" wires. But if you have supplied "RIMCO" *Rubber Insulated Pliers,* no harm can result should the line be "alive"—for you have erected a *"fool-proof"* barrier.

Therefore if your pliers are standardized and "RIMCO" pliers are *insisted upon,* you know your company is safeguarded at all times against liability.

It is nothing more or less than sound business practice—an investment that looks to the future.

"RIMCO" Pliers are tested to 10,000 *volts* and the soft rubber is *non-breakable and cannot come loose.*

Rubber Insulated Metals Corp.
Plainfield, New Jersey

SALES AGENTS: Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia. National Railway Appliance Co., 50 E. 42nd St., N. Y. City. Canadian Agent: Lyman Tube & Supply Co., Ltd., Montreal, Toronto and Winnipeg.

Exclusive Export Agents
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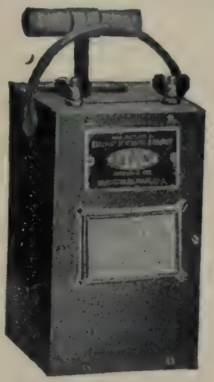
INCORPORATED

DU PONT AMERICAN INDUSTRIES

Don't Waste Explosives!

Tamp each charge thoroughly to confine the full force of the blast and use the explosive particularly designed for your kind of blasting operation.



One means of conserving is to use Red Cross Explosives. Another economy is to

Fire Charges Electrically

There is no reason for using dynamite of 40% or 60% strength when the same or better results can be accomplished with a grade of less strength.

And electric firing with dependable Du Pont blasting machines and electric blasting caps, is surer and safer.

Our High Explosives Booklet and our Blasting Supplies Catalog will advise what will best serve you. The coupon will bring you free copies.

E. I. du Pont de Nemours & Co.
Powder Makers Since 1802 Wilmington, Del.

Note: When in Atlantic City visit Du Pont Products Store, Boardwalk and Pennsylvania Ave., and Du Pont Shooting School on the ocean end Young's Million Dollar Pier.

The Du Pont American Industries Are:

E. I. du Pont de Nemours & Co., Wilmington, Del., Explosives.
Du Pont Chemical Works, New York, Pyroxylin and Coal Tar Chemicals.
Du Pont Fabrikoid Co., Wilmington, Del., Leather Substitutes.
The Arlington Works, 725 Broadway, New York, Ivory Py-ra-lin and Cleanable Collars.
Harrison Works, Phila., Pa., Paints, Pigments, Acids, Chemicals.
Du Pont Dye Works, Wilmington, Del., Coal Tar Dyestuffs.

MAIL THIS COUPON
Marking X Before Subject of Interest to
E. I. du Pont de Nemours & Co.
Adv. Div. (E. I. 24) Wilmington, Del.

- ☐ Blasting Supplies
- ☐ Blasting Powders
- ☐ Industrial Explosives
- ☐ Sporting Powders
- ☐ Trapshooting
- ☐ Gun Clubs
- ☐ Harrison Paints
- ☐ Vitrolac Varnish
- ☐ Flowkote Enamel
- ☐ Auto Finishes
- ☐ Sanitary Wall Finish
- ☐ Antoxide Iron Paint
- ☐ Bridgeport Wood Finish
- ☐ Metal Lacquers
- ☐ Pigment Bases
- ☐ FABRIKOID—Motor
- ☐ " Craftsman
- ☐ " Book-Finish
- ☐ " Sheeting
- ☐ " Truck Special
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- ☐ Fairfield Rubber Cloth
- ☐ PY-RA-LIN Specialties
- ☐ " Toilet Goods
- ☐ " Sheeting
- ☐ " Enamels
- ☐ Challenge Collars
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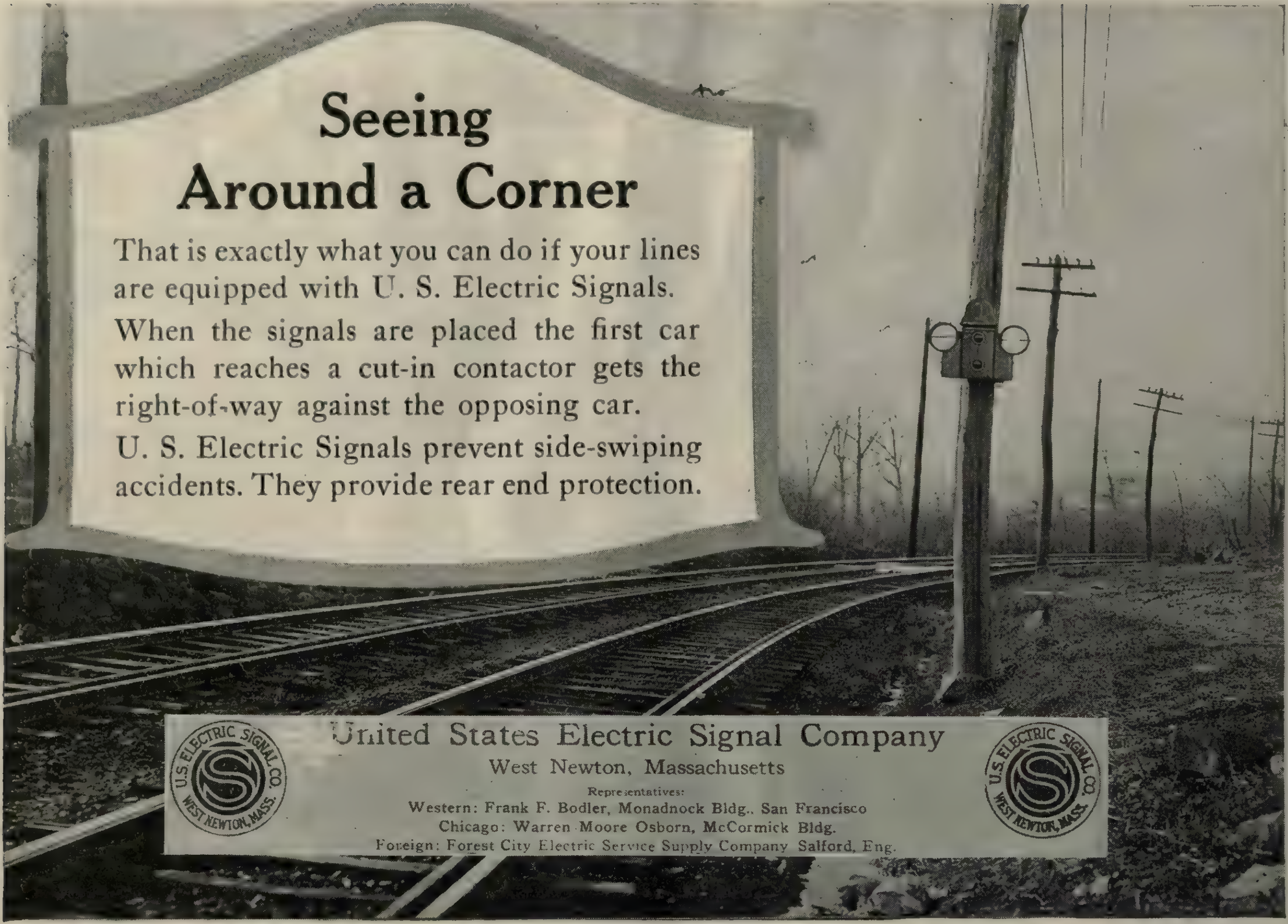
DU PONT



Seeing Around a Corner

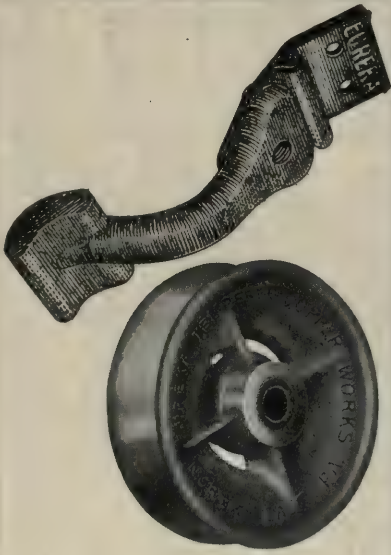
That is exactly what you can do if your lines are equipped with U. S. Electric Signals.

When the signals are placed the first car which reaches a cut-in contactor gets the right-of-way against the opposing car.

U. S. Electric Signals prevent side-swiping accidents. They provide rear end protection.

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Chicago: Warren Moore Osborn, McCormick Bldg.
Foreign: Forest City Electric Service Supply Company, Salford, Eng.



Workmanship
+
Material
+
Inspection
=
SERVICE

Before any article is deemed worthy to bear the name "Eureka" it must be perfect—perfect in workmanship, material and finish. Our inspection is rigid and that is your best guarantee that "Eureka" products will render the very fullest service value.

Write for Catalog

Contact Fingers
Trolley Wheels
Brush Holders
Sleet Cutters
Bearings
Bushings
Copper Forgings
Bronze Forgings
Castings
Commutators
Wire Stretchers
Line Ears
Etc., Etc., Etc.

North East, Pa.

The Eureka Co.

INSTALL THE "FRANKLIN" AND FORGET IT! ELECTRICAL DEVELOPMENT AND MACHINE CO. TRADE MARK GENERATING STATION EQUIPMENT

Please Be Skeptical

Here are two flat statements—too important to take on faith. Challenge us to prove them.

1. The "FRANKLIN" Disconnecting Switch with Positive "FRANKLIN" Lock not only resists electrical expulsion strains but locks tighter as the strains increase.
2. A single pull, from any angle with any kind of hook, will open it readily.

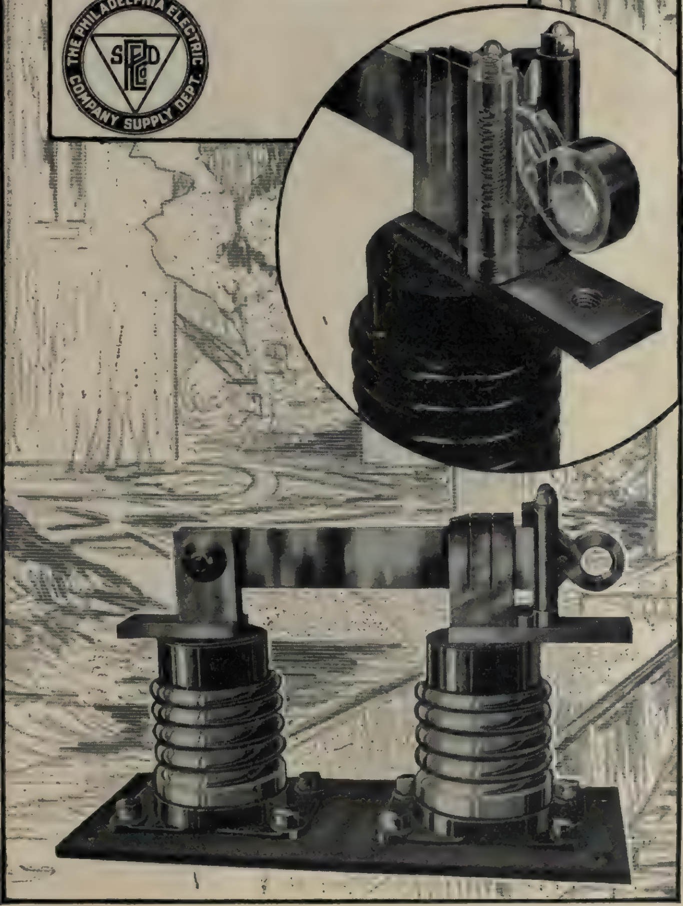
Fully described in Bulletin No. 1250. In writing, state service and voltage.

"FRANKLIN"

Disconnecting Switches, Insulators, Potheads, etc.

"Install the 'FRANKLIN' and forget it."

SELLING AGENTS
THE PHILADELPHIA ELECTRIC
COMPANY SUPPLY DEPT.
132 South Eleventh St.
Philadelphia



ECONOMY IN REPLACEMENTS

IT'S THE CONSTANT "LITTLE REPAIRS" THAT BUILD UP BIG MAINTENANCE COSTS

If you will check up on the cost of the work that is being done along your line—not the big replacement and new construction work—but just the little jobs replacing a few rotted crossarms or a few decayed ties, or a bit of fencing, you will probably be surprised to find how much these items total in the course of a year.

Of course you are never going to get away from *all* of this sort of expense, but you can eliminate a surprisingly heavy proportion of it by using

CYPRESS

"THE WOOD ETERNAL"

not only on new construction, but on all replacement work.

ALL-HEART CYPRESS comes the nearest to being "decay proof" of any lumber suitable for railway use.

Several of the largest railway companies in the country have found the use of Cypress a paying investment.

THEY'VE LEARNED TO INSIST ON SEEING THIS MARK ON EVERY BOARD AND ON EVERY BUNDLE.

The data that substantiates this fact will be promptly furnished, if you ask for it.

SOUTHERN CYPRESS MFRS' ASS'N

1265 Hibernia Bank Building, New Orleans, La., or
1265 Heard National Bank Building, Jacksonville, Fla.

SHIELD BRAND TAPES

Shield Brand Tapes are endorsed by experienced electricians everywhere. They are absolutely dependable. The most discriminating tape user will be satisfied.

SIXTEEN - SHIELD - BRANDS

are made of the very best material obtainable. They insure perfect insulation and remain uniform under the varying weather conditions.

United States Rubber Company
Mechanical Goods Division
New York

HYDRAULIC MACHINERY

will keep your rolling stock moving

We Show Here *Just One* of Our Many Presses for Armature Repairs and Numerous Operations of Pressing, Forcing, Bending, Etc.

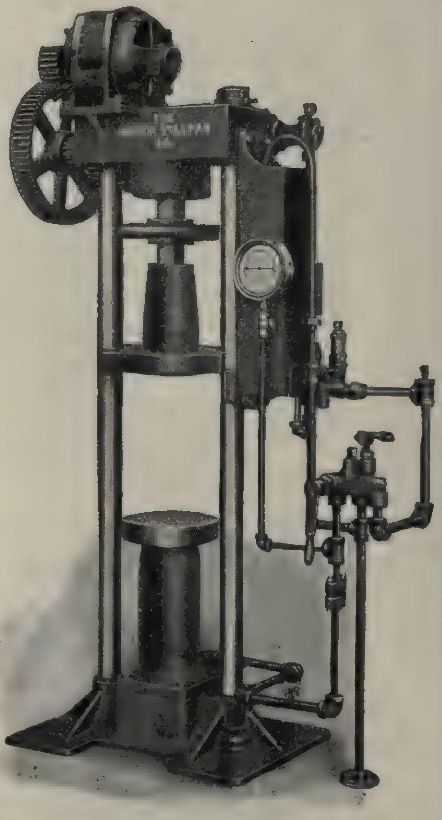
This press is a self-contained unit requiring no auxiliary water or power supply, driven like any lathe or machine tool. It can be arranged for belt drive if desired. The ram moves vertically upward, and above it is a resistance platen which is raised or lowered by the right- and left-hand screw to suit the various sizes of armatures.

The pump is double acting and is controlled by a stop and release valve with check which holds pressure on the ram as long as desired. We build many other handy hydraulic tools for the railway shop or for track maintenance, such as motor lifts, pit jacks, benders, shears, bonding presses, punches, rail benders, etc.

Write for Catalogs.

THE WATSON-STILLMAN COMPANY
46 Church Street, New York

Chicago, McCormick Bldg.
Pittsburgh, Brown & Zortman.



50-Ton Armature Press.

TRADE **YALE** MARK

HOISTING HINTS

Yale Spur-Geared Blocks are efficiently meeting war-time emergencies.

Yale Spur-Geared Block

They are increasing production, saving men and time.

The simplicity, rugged construction, speed and *safety* of Yale Spur-Geared Blocks make them indispensable for war work.

For hoisting under all conditions.

For factory locking equipment use a Yale Master-Key System. Write for particulars.

For Sale by Machinery Supply Houses

Put Your Hoisting Problems Up to Us

The Yale & Towne Mfg. Co.
No. 9 East 40th. St.
New York

VICTORY

Victory in war, as achievement in commerce, depends largely upon care in attention to details—such details, for instance, as the selection of fuses. A poorly operating or inaccurately rated fuse might seriously hinder the work on a man of war at a critical moment. The U. S. Navy is keenly awake to this fact.

ECONOMY 'renewable Fuses

have for years effectively safeguarded electrical circuits of our Navy, ashore and afloat.

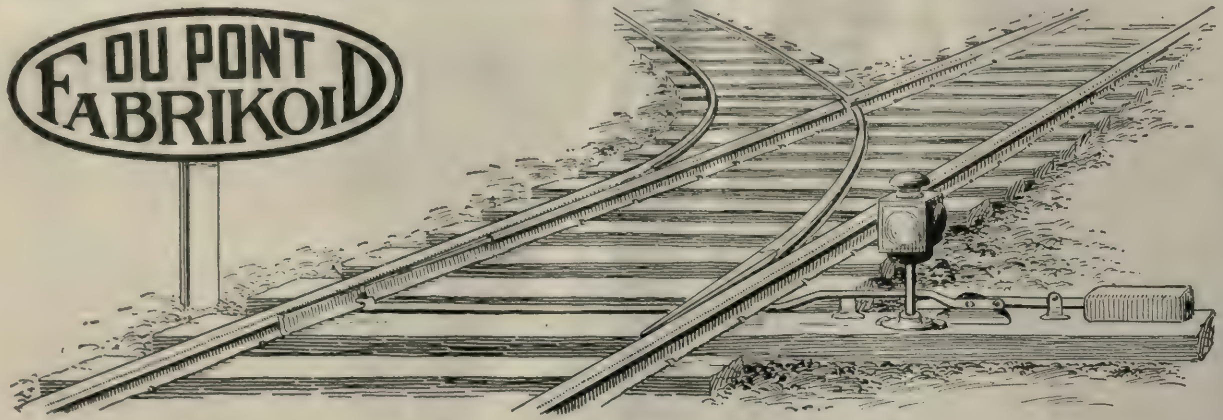
A new contract was recently awarded for another year's supply.

America's foremost electric railways also use Economy Fuses because they are safest and because they cut annual fuse maintenance costs 80%. An inexpensive "Drop Out" Renewal Link restores a blown Economy Fuse to its original efficiency.

Order by brand, from your electrical jobber or dealer. Write for catalog 17

Economy Fuse & Mfg. Co.
Kinzie & Orleans St. Chicago, U.S.A.

Sole manufacturers of "ARKLESS"—the Non-Renewable Fuse with the 100% Indicator



Switch Over to Fabrikoid

When you specify for new car seat upholstery. It costs less, wears better and retains its attractiveness longer than leather or plush.

Fabrikoid increases the comfort of your patrons because it is soft, pliable, luxurious, sanitary and cleanable.

Fabrikoid saves time, labor and waste in cutting and is easily applied. Used on some of the best lines. **Write for samples today.**

How Many Hides Has A Cow?

Du Pont Fabrikoid Company

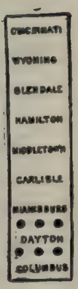
Wilmington, Del. **New Toronto, Canada.**

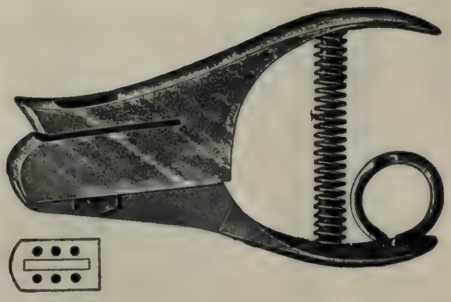
Wendell & MacDuffie Co., Railroad Department Representatives.
61 Broadway, New York City, N. Y.

We Make 100 Varieties of Ticket Punches But Only *One Quality*

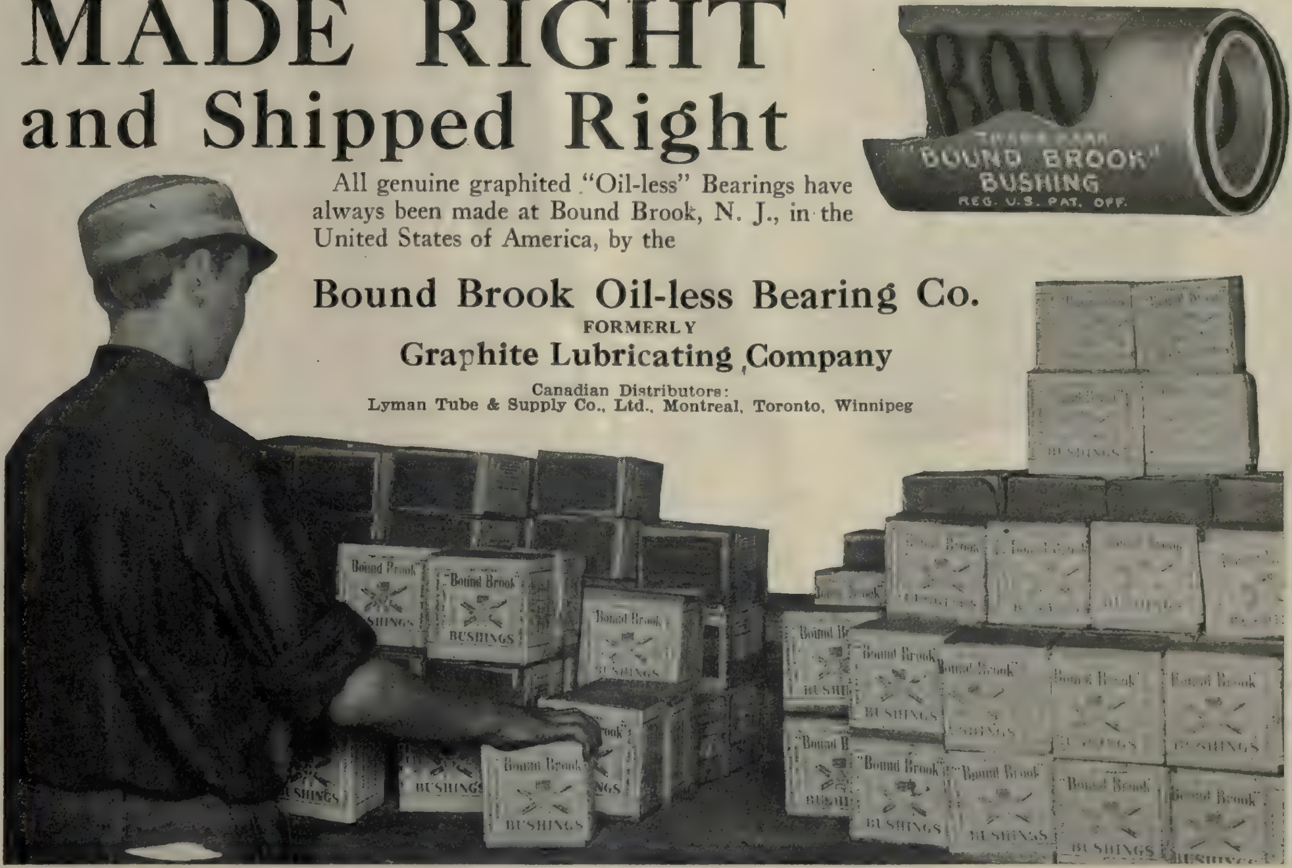
and that is B-V Quality

Bonney-Vehslage Tool Co.
61 New Jersey R. R. Ave.
Newark, N. J.





MADE RIGHT and Shipped Right



All genuine graphited "Oil-less" Bearings have always been made at Bound Brook, N. J., in the United States of America, by the

Bound Brook Oil-less Bearing Co.
FORMERLY
Graphite Lubricating Company

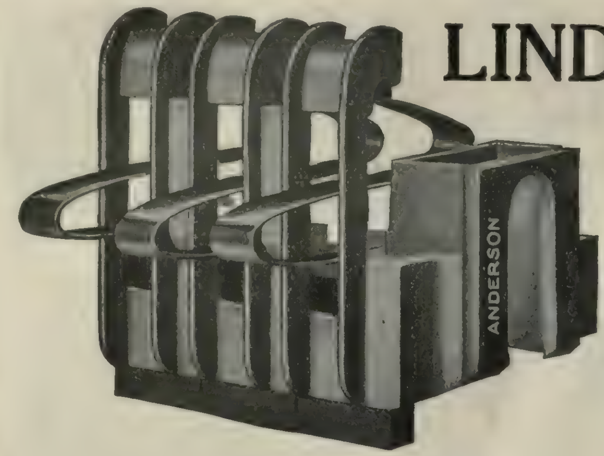
Canadian Distributors:
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg

Every Acceleration More Economical With Rollway Bearings

Static Inertia or that innate resistance of matter to motion can be greatly reduced by having the bearing surface rollers.

Coasting and Skip Stops both tend to Conserve Coal, their aim being to reduce the number of accelerations. Why not go to the head of the trouble and use roller bearings, making every acceleration more economical with less maximum demand on the power station?

The Railway Roller Bearing Co.
Syracuse, New York



LINDALL Brush Holders

Insure Better Contact Longer Commutator Life

Lindall Brush Holders provide a steady brush pressure, holding the brushes securely, even under extremely heavy jarring. The brushes are held with phosphor bronze springs, and cannot bind or stick. There are no screws to work loose—the brush is easily removed and inserted. A large contact between brush and spring makes pigtails unnecessary.

With Lindall Brush Holders you will get a perfect contact under all conditions, eliminate "brush chatter," increase the life of commutators, and avoid all trouble. Send for details.

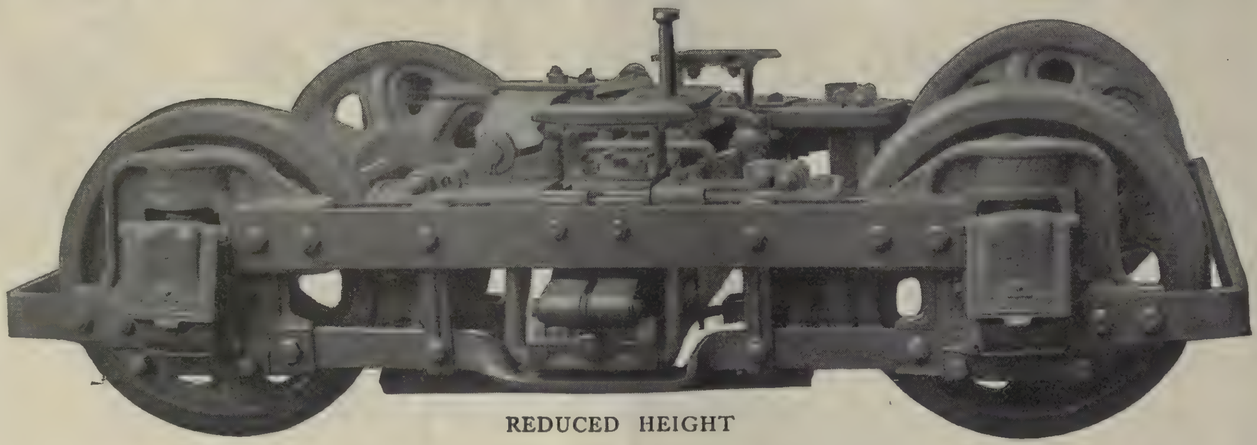
Albert & J. M. Anderson Mfg. Co.

289-293 A Street (Established 1877) **Boston, Mass., U. S. A.**

BRANCHES:
New York, 135 Broadway.
Chicago, 105 So. Dearborn Street.
Philadelphia. 429 Real Estate Trust Bldg.
London, E. C., 48 Milton Street.

R. H.

TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-Inch Wheels With Springs Over Journal Boxes
Designed to Mount Centre and End Entrance Cars Low Down

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M.C.B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

Established 1892

SPECIFICATIONS ON REQUEST **SEND FOR PORTFOLIO**

"STANDARD"

Steel Tires Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings Iron Forgings
Forged and Rolled Steel
Pipe Flanges
Ring Dies Rings Roll Shells
Steel Springs

S BRAND *"The 'Standard' Brand on your material is an assurance of eventual economy."* S BRAND

STANDARD STEEL WORKS CO.

GENERAL OFFICES:
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ST. LOUIS
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LONDON, ENGLAND
PARIS, FRANCE

BRAKE SHOE STANDARDS

BRAKE HEADS—to take
Standard Pattern Shoe
One standard driver shoe
One standard car shoe
And there you are—

ASK US

American Brake Shoe & Foundry Co.
30 Church St., New York
McCormick Bldg., Chicago Chattanooga, Tenn.

"The Quality Shops"
CARS TRUCKS

The One Man Car

has passed out of the experimental stage. Since 1913 it has been in successful operation in many cities, where it has enabled the operating companies to please the public with quicker and more frequent service, and, at the same time, it has cut operating costs.

One-man control is safe, since there can never be any misinterpretation of signals. The car cannot be started until the door is closed and the step swung up, nor can the door be opened until the car is stopped. A unit air-brake control accomplishes this interlocking.

At the rear of the car is an emergency exit, operated by the motorman-conductor independently of the master controller which opens the front door.

Our engineers will be glad to tell you how One-Man Cars will help you.

St. Louis Car Company
St. Louis, Mo.

You Are Never in Doubt

when your road is protected by

Nachod Signals

No matter what your road conditions are, a Nachod will take care of them. There are 7 types of Nachods for all service, from high speed interurban to city travel.

Write for information.

Nachod Spells Safety.

NACHOD SIGNAL CO., Inc.
Louisville, Ky.

PACIFIC COAST REPRESENTATIVES

ECCLES & SMITH CO., Portland, Oregon, San Francisco, Cal.,
Los Angeles, Cal.

2224

THE LINDSLEY BROTHERS CO.

Western "Good Poles Quick" Northern

Quick Shipments from our Minneapolis Yard

Rooms 832-834, 72 West Adams St.
CHICAGO, ILL.
Spokane — St Louis

Butt Treating Open Tank and "Hot and Cold" Processes

"NATIONAL"

TUBULAR STEEL POLES
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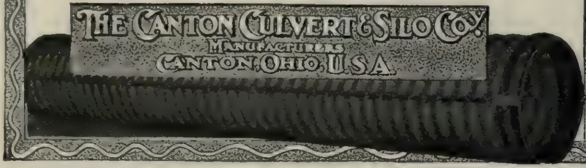

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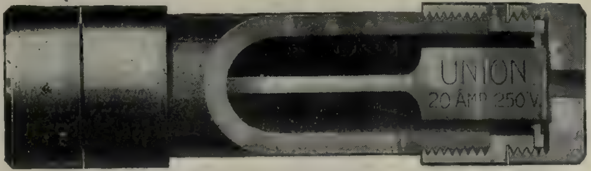

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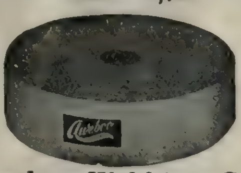

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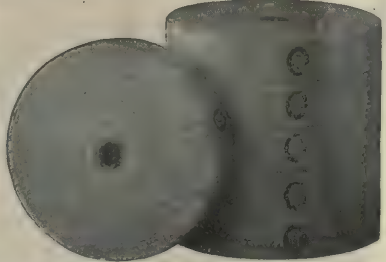

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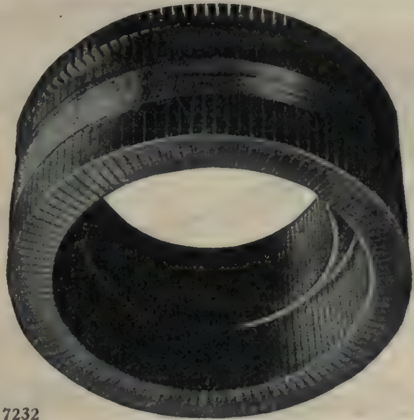

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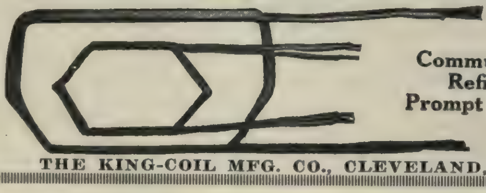

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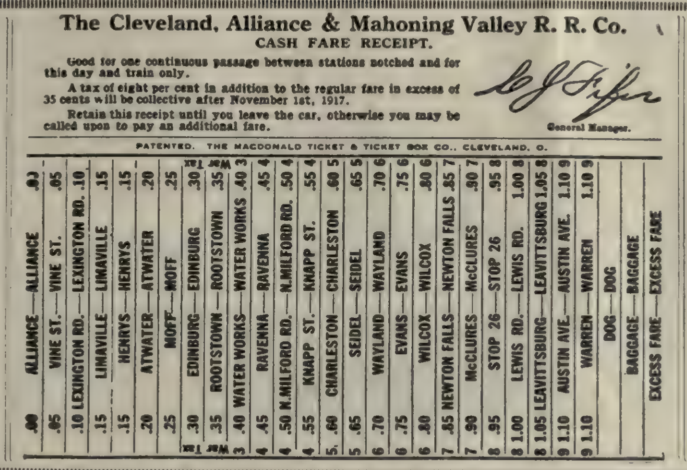

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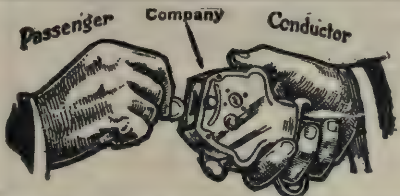

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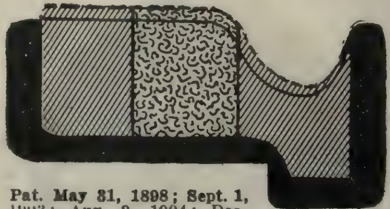

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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS

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"HONEYCOMB" AND "ROUND JET" VENTILATORS for Monitor and Arch Roof Cars, and all classes of buildings; also ELECTRIC THERMOMETER CONTROL of Car Temperatures.

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1328 BROADWAY
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The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

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ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
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3—750-kw. General Electric, 60-cy., O.I.S.C., 2200/4400 volts prim., 281/488 Y secy.
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Five (5) NEW Double

TRUCK CARS

Length 45 ft. 0 in. Equipped with 4 G. E. Co.'s 247 Motors and G.E. Co.'s Air Brakes. For delivery October 15th, 1918.

Two (2) Double

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Lengh 44 ft. 6 in. Equipped with 4 G. E. Co.'s 203 Motors and Air Brakes. Immediate Delivery.

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Cars and Trucks—Snow Sweepers
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25 Cycle

8000 KW. latest type Allis-Chalmers, 25-cycle, 3-phase, 6600-volts, with 16,000 sq. ft. surface condenser equipment.

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Two 1000 KW. General Electric, 3-phase, 60-cycle, 600 volts D.C., with three OI SC single phase transformers, 13,200 volts, also A.C. and D.C. panels.

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OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full Particulars to

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Equally as good as new, approximately fourteen miles 2/0 bare grooved

TROLLEY WIRE

and four miles 4/0 in long lengths, second-hand, but in first-class condition.

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75 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to lengths for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

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CARS

4—4-wheel Open Trolley Cars, seating capacity 32, complete, ready for immediate service.

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FIRST Get Bulletin 237—or, Wire

ZELNICKER IN ST. LOUIS

Before buying or selling

RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.
What have you for sale?

Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m. Cp. Wd. Westinghouse 3 bearing direct current generator.

DUQUESNE Electric & Mfg Co.

Write, wire or 'phone our nearest office, Pittsburgh, Pa., or 230 La Salle St., Chicago, Ill.

FOR SALE

1—Allis-Chalmers

MOTOR

30-hp., 625-r.p.m., 500-v.

Buffalo, Lockport & Rochester Railway Company
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NEW EDISON STORAGE BATTERIES

Have 225 new cells A-10 Edison Nickel Steel Batteries. In fine condition. Never used. 1 8/10 volts per cell for heavy continuous work. Cannot break them down on overload. Fine for railway signaling work. electric light storage. Any purpose where reliable batteries are needed. *Will sell for less than half of cost price.* Write quick. Next to largest size made.

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AIR COMPRESSOR

Sullivan Straight Line Steam Driven, 2-Stage, Class WB-2

Capacity, 1160 cu.ft.
Diameter, steam cylinder, 20 in.
Diameter, L.P. air cylinder, 22 in.
Diameter, HP. air cylinder, 14 in.
Stroke, 24 in.
Total weight, 33,500 pounds.
Price, $1500.00.

Thoroughly Overhauled and Ready for Immediate Shipment.

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Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

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All or any part of 170,750 pounds 7-strand 1/0 bare copper

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new and on original reels.

Subject to prior sale.

The Northern Ohio Traction & Light Co.
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FOR SALE

Immediately Delivery

7000 New Machine Bolts, 1⅛-in. x 5-in. Square head, hexagon Nut, machine turned, intended for rail joints. Full specifications on request.

Following Second Hand Equipment

1—Foster Super Heater, Patent Nov. 17, 1903, No. 744323; pounds of steam per hour, 500. Steam pressure 40 lb. Degrees super-heat, 64. Final steam pressure, 350.
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50—B-23 Controllers.
12—Westinghouse 38-B Motors, complete, 500 volts.
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FOR SALE

One reel of 5000 ft. 4/0 B. & S. soft copper, 19 strand.

CABLE

New, never removed from reel. Unable to use by reason of change in terminal construction specifications. Write or wire if interested, making best offer f.o.b. Michigan City, Ind.

H. F. KIRKY, Purchasing Agent
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MICHIGAN CITY, IND.

Little "WANT" cards bring big results in the Electrical Railway Journal

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60 Tons

7-in Girder Rails

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HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

When you want

Men

Put your advertising for them on the same basis as other publicity.

If you want competent and efficient assistants, experienced in the field served by this journal, you will naturally find such men among our readers—which include the keenest and most progressive men in the industry.

Get in touch with a number of these men and select the one that is best suited for your needs.

Only $1.50 *for* 30 *words.*

GET YOUR WANTS INTO THE "SEARCHLIGHT"

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(Solid, in one paragraph, without display.)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

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FIVE CENTS A WORD, minimum charge $1.50 an insertion, for advertisement under:

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(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 27 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

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1 to 3 in.,	$3.00 an in.	15 to 26 in.,	$2.70 an in.
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Rates for arger space furnished on request.

For quick and satisfactory results tell the reader everything that he wants to know

INFORMATION

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
1570 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
1011 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	San Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitaties receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

Your Advancement

is largely in your own hands—it is doubtful if anyone else is worry over it

Better positions are constantly bieng secured through small advertisements in the "Positions Wanted Columns."

60 cents for 20 words

WANTED
Second-Hand Brill 77-E-1
TRUCKS
for 26 in. wheels. Low price and information to
BEAVER VALLEY TRACTION CO.
New Brighton, Pa.

POSITIONS VACANT

MEN (for essential industry) to break in as power and sub-station operators, 8 hours per day, paid while learning, good chance for advancement. Electrical experience desired, but not required. Apply 8 to 10 a. m. at 3046 Fulton St., Brooklyn.

NIGHT car barn foreman wanted, and six general repair men. Address Little Rock Railway & Electric Company, 115 West 4th Street, Little Rock, Arkansas.

ASSISTANT SUPERINTENDENT wanted by street railway in southwestern city of twenty thousand, operating twelve cars. Excellent opportunity for energetic man. P-239, Elec. Ry. Journal, Chicago.

TWO first-class all-around barn men wanted for small street system. State experience fully, salary wanted, and when you can report for duty. Pascagoula St. Ry. & Power Co., Pascagoula, Miss.

THOROUGHLY efficient, competent and tactful man wanted for position as superintendent or transportation for small street railway system. State experience fully, furnish recommendations, advise as to age, married or single, salary wanted and when you could report for duty. Pascagoula St. Ry. & Power Co., Pascagoula, Miss.

WANTED
First Class
ARMATURE WINDER
good pay; well heated shop; good working conditions. Apply
BEAVER VALLEY TRACTION CO.
New Brighton, Pa.

POSITIONS WANTED

ENGINEER—Valuations, several complete appraisals. Also experienced maintenance of way, construction, designs in steam, street, interurban railways and structures. Fifteen years' experience. Age 36; married. Salary, $250. References exchanged. PW-237, Elec. Ry. Journal, Chicago.

POSITION as general manager of railway property wanted. Twenty years of experience in city and interurban operation. Successful in handling men. Trained under best managers in the business. East or Middle West preferred. PW-238, Elec. Ry. Journal, Phila.

WANTED
2 Passenger Cars
Complete Equipment
Capacity 45 people

1 Work Car
5-ft. Gauge
Complete Equipment
W234—Elec. Ry. Journal,
Real Estate Trust Bldg., Phila., Pa.

Keep Your Eye on The "Searchlight"
and your advertisements in it

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car.
Collier, Inc., Barron G.

Air Rectifiers.
Holden & White, Inc.

Alloys, Steel and Iron (See also Bearings and Bearing Metals)
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improv. Co.

Automobiles and Buses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The.
Woodman Mfg. & Supply Co., R.

Bankers and Brokers.
Coal & Iron National Bank.

Batteries, Dry.
Nichols-Lintern Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side.
Holden & White, Inc.

Bearings, Oil-less, Graphite, Bronze and Wood.
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

Bells and Gongs.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker Supply Company, Inc., Walter A.

Blasting Powder and Equipment.
Du Pont de Nemours Co., E. I.

Boiler Tubes.
National Tube Co.

Boilers.
Babcock & Wilcox Co.

Bond Testers.
American Steel & Wire Co.
Lincoln Bonding Co.

Bonding Apparatus.
Elecric Railway Improv. Co.
Imperial Brass Mfg. Co.
Lincoln Bonding Co.
Ohio Brass Co.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

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Creaghead Engrg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

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Westinghouse Trac. Brake Co.

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American Brake S. & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Wheel Truing Brakeshoe Co.

Brakes, Brake Systems and Brake Parts.
Bemis Car Truck Co.
Brill Co., The J. G.
British Westinghouse Elec. & Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

Bridges and Buildings
American Bridge Co.

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Zelnicker Supply Company, Inc., Walter A.

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General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Eureka Co.

Bunkers, Coal
American Bridge Co.

Bus Bar Supports
Philadelphia Electric Company Supply Dept., The.

Bushings, Case Hardened Manganese.
Bemis Car Truck Co.

Bushings, Graphite and Wooden.
Bound Brook Oil-less Bearing Co.

Cables. (See Wires and Cables.)

Cable End Bells
Philadelphia Electric Company Supply Dept., The.

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)

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American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co., Inc., W. R.

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Electric Storage Battery Co.
British Westinghouse Electric & Mfg. Co.
General Electric Co.

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Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & M. Co.

Castings, Gray Iron and Steel.
American B. S. & Fdry. Co.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

Castings, Malleable and Brass.
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., C. N.

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Keyes Products Co.
Pantasote Co.

Checks, Employees.
American Railway Supply Co.

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General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors, for Wires and Cables.
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Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Philadelphia Electric Company Supply Dept., The.
Westinghouse Elec. & M. Co.

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Ohio Brass Co.
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Coils, Choke & Kicking.
Electric Service Supplies Co.
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General Electric Co.

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General Electric Co.
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Single Phase
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One of the Portable Electrodynamometer Group, which also includes Model 329 Polyphase Wattmeter, Model 341 A.C. and D.C. Voltmeter and Model 370 A.C. and D.C. Ammeter.

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Pacemakers for 29 Years

It is one thing to take the lead; quite another thing to hold it.

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Indicating Instruments

were the first exponents of the Art of Electrical Measurement as it is known today. But of far greater importance is the fact that since the beginning substantially every advance in the Art has originated with this Company and found its first embodiment in this Company's Instruments.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or D.C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

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Creaghead Engrg. Co.
Electric Service Supplies Co.

Detective Service.
Wish Service, P. Edward

Door Operating Devices.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures.
Brill Co., The J. G.
Hale & Kilburn Corp.

Doors, Folding Vestibule.
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers, Car.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker Supply Co., W. A.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Beeler, John A.
Drum & Co., A. L.
Ford, Bacon & Davis.
Republic Engineers Inc.
Richey, Albert S.
Sanderson & Porter.
Sargent & Lundy.
Scofield Engineering Co.
Sloan, Huddle, Feustel & Freeman
Stone & Webster.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

Engines, Gas and Oil.
Westinghouse Elec. & M. Co.

Engines, Steam.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co. The
National Railway Appliance Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.
Page Steel & Wire Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Root Spring Scraper Co.
Star Brass Works.
Trolley Supply Co.
Wood Co., Charles N.

Fibre and Fibre Tubing.
Westinghouse Elec. & M. Co.

Field Coils. (See Coils.)

Filters, Water.
Scaife & Sons Co., Wm. B.

Floodlights.
Crouse-Hinds Co.
Electric Service Supplies Co.

Flooring, Composition.
American Mason Safety T. Co.

Forgings.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.

Fuses and Fuse Boxes.
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.

Gages, Oil and Water.
Ohio Brass Co.

Gaskets.
Power Specialty Co.
Westinghouse Trac. Brake Co.

Gas-Electric Cars.
General Electric Co.

Gas Producers.
Westinghouse Elec. & M. Co.

Gates, Car.
Brill Co., The J. G.

Gear Blanks.
Carnegie Steel Co
Standard Steel Wks. Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

Gears and Pinions.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric.
General Electric Co.

Generators.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Gongs. (See Bells and Gongs.)

Graphite.
Morgan Crucible Co.

Grates, Chain.
Green Eng'g Co.

Greases. (See Lubricants.)

Grinding Blocks & Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Grinders and Grinding Supplies.
Railway Track-work Co.

Guards, Trolley.
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights.
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.

Headlining.
Kerschner Co., Inc., W. R.
Keyes Products Co.
Pantasote Co.

Heaters, Car, Electric.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Stove.
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists and Lifts.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

Hose Bridges.
Ohio Brass Co.

Hydraulic Machinery.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Inspection.
Elec'l Testing Laboratories.

Instruments, Measuring, Testing and Recording.
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulated Wire Cutters
Rubber Ins. Metals Corp.

Insulating Cloths, Paper and Tape.
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints.)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material.)
Anderson M. Co., A. & J. M.
Creaghead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins.
Electric Service Supplies Co.
Hubbard & Co.

Insulators, Post Type
Philadelphia Electric Company Supply Dept., The.

Inventions, Developed and Perfected.
Peters & Co., G. D.

Jacks. (See also Cranes, Hoists and Lifts.)
Brill Co., The J. G.
Buckeyey Jack Mfg. Co.
Columbia M. W. & I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co., Ltd.
Templeton Kenly & Co., Ltd.
Watson-Stillman Co.

Joints, Rail.
Carnegie Steel Co.
Zelnicker Supply Co., Inc., W. A.

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Brill Co., The J. G.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

Junction Boxes.
Standard Underground Cable Co.

Laboratories.
Elec'l Testing Laboratories.

Lamp Guards and Fixtures.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent.
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Signal and Marker.
Nichols-Lintern Co.
Ohio Brass Co.

Lathes, Car Wheel.
Niles-Bement-Pond Co.

Lights, Portable Carbide
Milburn Co., The Alex.

Lighting Regulators, Car.
Holden & White, Inc.

Lightning Protection.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Dick, Kerr & Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locks.
Yale & Towne Mfg. Co.

Locomotives, Electric.
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers.
Galena-Signal Oil Co.

Lubricants, Oil and Grease.
Borne, Scrymser Co.
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, Posts etc.)

Machine Work.
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Machine Tools.
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Manganese Parts.
Bemis Car Truck Co.

Meters, Car, Watthour.
Economy Electric Devices Co.

Meters (See Instruments.)

Mica.
Macallen Co.
Mechanical Rubber Co.

Mirrors for Motormen.
Drew Elec. & Mfg. Co.

Motormen's Seats.
Electric Service Supplies Co.
Wood Co., C. N.

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Lincoln Bonding Co.

Motors and Generators Sets
General Electric Co.

Motors, Electric.
British Westinghouse Electric & Mfg. Co.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Nuts and Bolts.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Oils. (See Lubricants.)

Overhead Equipment. (See Line Material.)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Packing.
Power Specialty Co.
United States Rubber Co.
Westinghouse Trac. Brake Co.

Paints and Varnishes. (Insulating.)
Holden & White, Inc.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Mitchell-Rand Mfg. Co.
Standard Paint Co.

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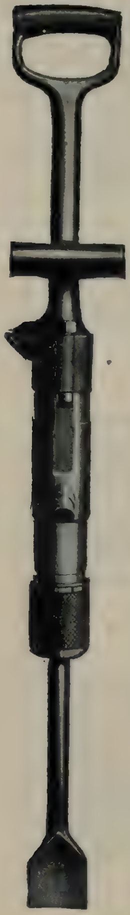
Standard Paint Co.

Paints and Varnishes for Woodwork.
National Railway Appliance Co

Paving Material.
American B. S. & Fdry. Co.

Pickups. (Trolley Wire.)
Electric Service Supplies Co.
Ohio Brass Co.



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General Electric Co.
Wood Co., C. N.

Pinions. (See Gears.)

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Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Pipe.
National Tube Co.

Pipe Fittings.
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Trac. Brake Co.

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Electric Service Supplies Co.
National Railway Appliance Co.
Rubber Ins. Metals Corp.

Pneumatic Hose.
Westinghouse Trac. Brake Co.

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Electric Railway Equipment Co.
Hubbard & Co.
National Railway Appliance Co.

Pole Sleeves.
Drew Elec. & Mfg. Co.

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Carney & Co., B. J.
Lindsley Bros. Co.
Northern White Cedar Assn.
Southern Cypress Mfgrs. Assn.
White Marble Lime Co.

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Lindsley Bros.

Poles, Trolley.
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Pole Reinforcing.
Hubbard & Co.

Poles, Tubular Steel.
National Tube Co.

Potheads.
Okonite Co.
Philadelphia Electric Company Supply Dept., The.

Power Saving Devices.
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

Pressure Regulators.
General Electric Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Pumps.
Watson-Stillman Co.

Punches, Ticket.
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

Punching Machinery.
Watson-Stillman Co.

Purifiers, Feed Water.
Scaife & Sons Co., Wm. B.

Rail Grinders. (See Grinders.)

Rails, Relaying.
Zelnicker Supply Company, Inc., Walter A.

Rail Welding. (See Welding Processes and Apparatus.)

Rattan.
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Arthur Power-Saving Recorder Co.

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Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcing Concrete.
American Steel & Wire Co.

Relays, Reverse Phase
Philadelphia Electric Company Supply Dept., The.

Repair Shop Appliances. (See also Coil Banding and Winding Machines.)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils. Armature and Field.)
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.

Replacers, Car.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid.
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube.
General Electric Co.
Westinghouse Elec. & M. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)

Rheostats.
General Electric Co.
Westinghouse Elec. & M. Co.
Mica Insulator Co.

Roofing, Building.
Standard Paint Co.

Roofing, Car.
Keyes Products Co.
Pantasote Co.

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United States Rubber Co.

Sanders, Track.
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car.
Brill Co., The J. G.

Sash, Metal, Car Windows.
Hale & Kilburn Co.

Seating Material. (See also Rattan.)
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Pantasote Co.

Seats, Car.
Brill Co., The J. G.
Hale & Kilburn Corp.
Peters & Co., G. D.
St. Louis Car Co.

Second-Hand Equipment. (See Searchlight Section.)
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co.

Shades, Vestibule.
Brill Co., The J. G.

Shovels.
Hubbard & Co.

Signals, Car.
Nichols- Lintern Co.

Signals, Car Starting.
Electric Service Supplies Co.
Consolidated Car Heating Co.
National Pneumatic Co.

Signals, Highway Crossing.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Signal Systems, Block.
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.

Slack Adjusters. (See Brake Adjusters.)

Sleet Wheels and Cutters.
Anderson M. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
Nuttall Co., R. D.

Snow-Plows, Removers, Sweepers, etc.
Brill Co., The J. G.
Consolidated Car Fender Co.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.
Remmele & Maier.

Soldering and Brazing Apparatus. (See Welding Proc. & App.)

Solderless Connectors
Westinghouse Elec. & Mfg. Co.

Speed Indicators.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

Spikes.
American Steel & Wire Co.

Splicing Compounds.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Splicing Sleeves. (See Clamps and Connectors.)

Springs, Car & Truck.
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.

Sprinklers, Track and Road.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car.
American Mason S. T. Co.
Universal Safety Tread Co.

Stokers, Mechanical.
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

Storage Batteries. (See Batteries, Storage.)

Strand
Roebling's Sons Co., J. A.

Straps, Car, Sanitary.
Holden & White, Inc.
Railway Improvement Co.

Structural Iron. (See also Bridges.)

Superheaters.
Babcock & Wilcox.
Power Specialty Co.

Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)

Switchstands.
Ramapo Iron Works.

Switches, Lock
Philadelphia Electric Company Supply Dept., The.
Weiss Switch Lock Co.

Switches, Track. (See Track, Special Work.)

Switches and Switchboards.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Tampers, Tie.
Ingersoll-Rand Co.

Tapes & Cloth. (See Insulating Cloths, Paper and Tape.)

Telephones and Parts.
Electric Service Supplies Co.

Terminal Cables.
Standard Underground Cable Co.

Testing, Commercial and Electrical.
Electrical Testing Laboratories.

Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)

Thermostats.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

Ticket Boxes.
Macdonald Ticket & Ticket Box Co.

Ticket Choppers and Destroyers.
Electric Service Supplies Co.

Tickets and Transfers.
American Railway Supply Co.

Ties, Mechanical.
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel.
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood. (See Poles, Ties, etc.)

Tools, Track and Miscellaneous.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Railway Track-work Co.

Torches, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Towers and Transmission Structures.
American Bridge Co.
Archbold-Brady Co.
Westinghouse Elec. & M. Co.

Track, Special Work.
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Ramapo Iron Works.
St. Louis Frog & Switch Co.

Transfers. (See Tickets.)

Transfer Issuing Machines.
Ohmer Fare Register Co.

Transfer Tables.
American Bridge Co.
Archbold-Brady Co.

Transformers.
General Electric Co.
Westinghouse Elec. & M. Co.

Treads, Safety Stair Car Step.
American Mason Safety Tread Co.
Universal Safety Tread Co.

Trolley Bases.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Supply Co.

Trolley Bases, Retrieving.
Holden & White, Inc.

Trolley Shoes.
Holden & White, Inc.
Miller Trolley Shoe Co.

Trolley Wire
Roebling's Sons Co., J. A.

Trolleys and Trolley Systems.
Ford Chain Block & Mfg. Co.

Trucks, Car.
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

Tubing, Steel.
National Tube Co.

Turbines, Steam.
General Electric Co.
Westinghouse Elec. & M. Co.

Turnstiles.
Perey Mfg. Co., Inc.

Valves.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Varnishes. (See Paints, etc.)

Ventilators, Car.
Automatic Ventilator Co.
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co
Nichols-Lintern Co.
Railway Utility Co.
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Washers.
Bound Brook Oil-less Bearing Co.
Diamond State Fibre Co.

Water Softening and Purifying Systems.
Scaife & Sons Co., Wm. B.

Welders, Portable Electric.
Electric Railway Improv. Co.
Lincoln Bonding Co.

Welding Processes and Apparatus.
Electric Railway Improvement Co.
General Electric Co.
Imperial Brass Mfg. Co.
Lincoln Bonding Co.
National Railway Appliance Co.
Westinghouse Elec. & M. Co.

Wheel Grinders.
Wheel Truing Brake Shoe Co.

Wheel Guards. (See Fenders and Wheel Guards.)

Wheels, Car, Cast Iron.
American Steel & Wire Co.
Association of Mfrs. of Chilled Car Wheels.
Bemis Car Truck Co.

Wheels, Car. (Steel and Steel Tired.)
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley.
Anderson M. Co., A. & J. M.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Whistles, Air.
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Wire Rope.
American Steel & Wire Co.
Roebling's Sons Co., John A.

Wires and Cables.
Aluminum Co. of America.
American Electrical Works
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Kerite Insulated Wire& Cable Co.
Okonite Co.
Page Steel & Wire Co.
Standard Underground Cable Co.
Westinghouse Elec. & M. Co.

Wood Preservatives.
Lindsley Bros. Co.

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Specify Titanium-Treated Rail for DURABILITY—

A battleship with blowholes in its armor is not very dependable; nor a rail in which structure-weakening and life-shortening impurities have been allowed to remain.

The dependability—and consequently the durability—of Titanium-Treated rail is due to the fact that the metal is so thoroughly cleansed of all harmful elements that the finished rail is a uniform product of longer life and greater safety

The low cost of

TITANIUM TREATMENT

$2.00 per ton, compared with the cost of rail, makes its use for any important service obvious.

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

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Ball Bearings will eliminate your lubrication worries and save you money

It takes about half an hour to pack the journal boxes of a double-truck car.

Just that much labor and car-time wasted every few days.

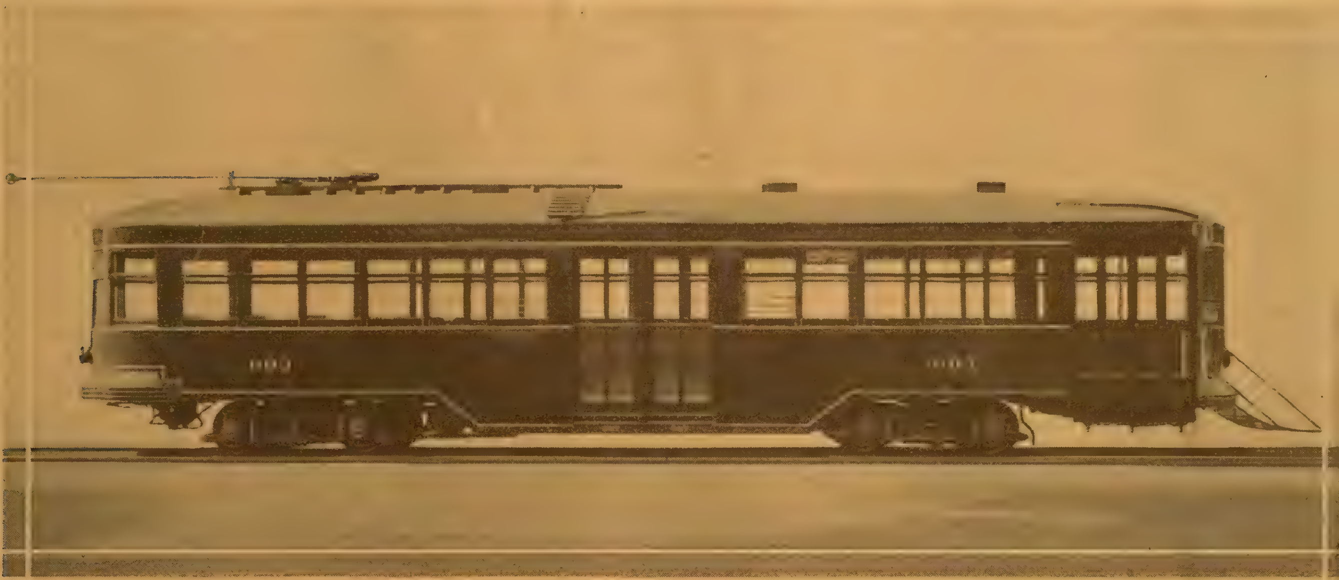
Add to these the cost of lubricant, hot boxes, of bearing renewals, of packing; and the waste in energy for car propulsion.

Let us figure with you on the handsome returns which Gurney Ball Bearings offer you in their decrease of lubrication and power costs and their increase of revenue miles for your cars.

Gurney Ball Bearing Co.
Conrad Patent Licensee
Jamestown, N. Y.

255

THE PETER WITT TYPE



Modern Cars Speed Up Car Loading

THE value of a well-designed car from the standpoint of ability to load quickly and, therefore, to maintain a high schedule speed, or conversely, to operate a greater number of car-miles for a given platform expense, is well shown by some tests made recently by C. D. Smith, superintendent of transportation Mahoning & Shenango Railway & Light Company, Youngstown, Ohio. The loading times expressed in seconds per passenger were found to be as follows: Peter Witt car, 0.9 second; standard-type car with doors at both ends, 1.35 second, and high-floor center-entrance car, 1.5 second.

These cars are roughly of the same seating capacity. The Peter Witt cars were of the lot of thirteen delivered to the company last September. The data were taken at the Public Square in Youngstown, from which point all cars start their runs. During the rush-hour period the passenger interchange at this point is very heavy.

—From Electric Railway Journal of July 27, 1918.

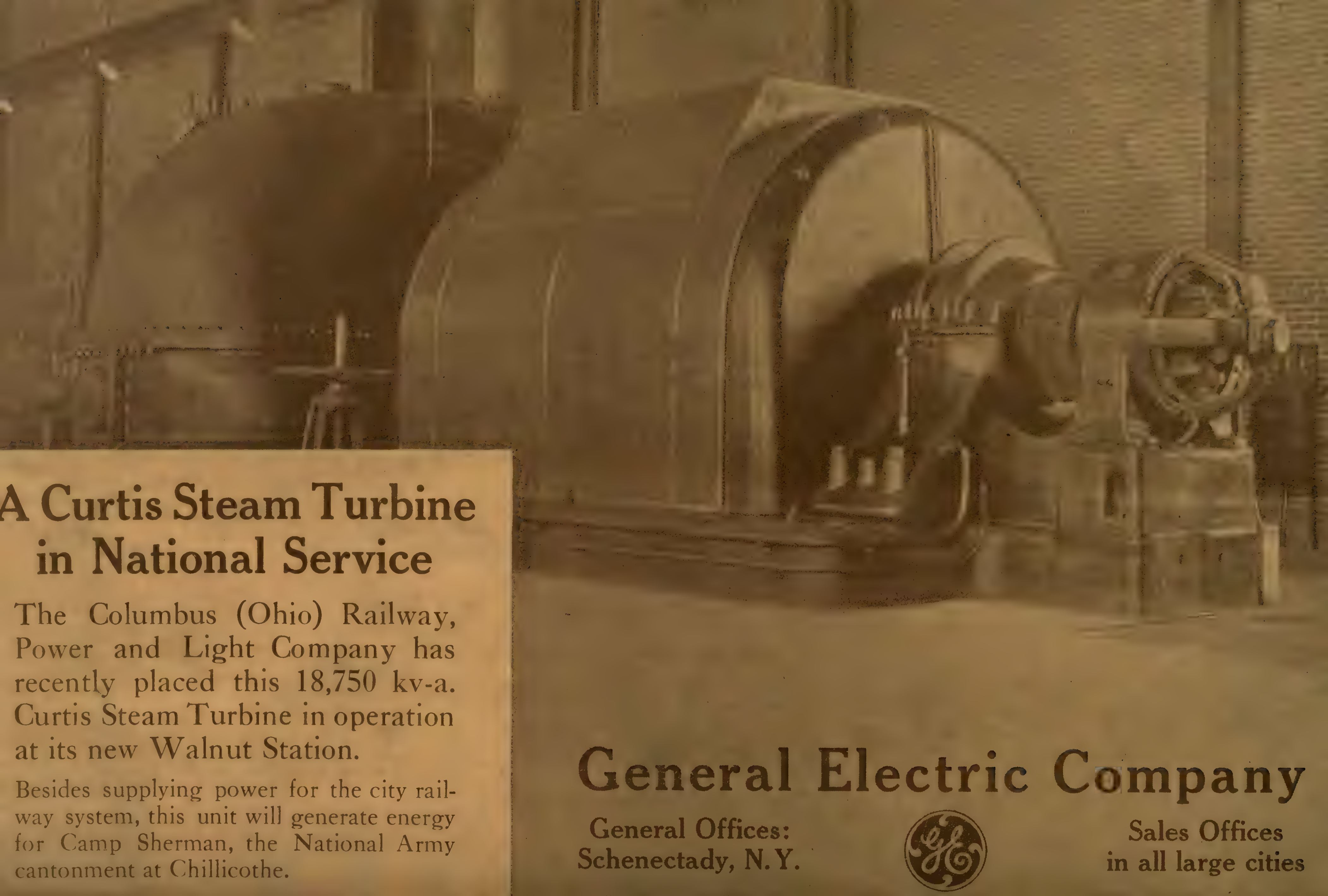
THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

BRILL

AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.



A Curtis Steam Turbine in National Service

The Columbus (Ohio) Railway, Power and Light Company has recently placed this 18,750 kv-a. Curtis Steam Turbine in operation at its new Walnut Station.

Besides supplying power for the city railway system, this unit will generate energy for Camp Sherman, the National Army cantonment at Chillicothe.

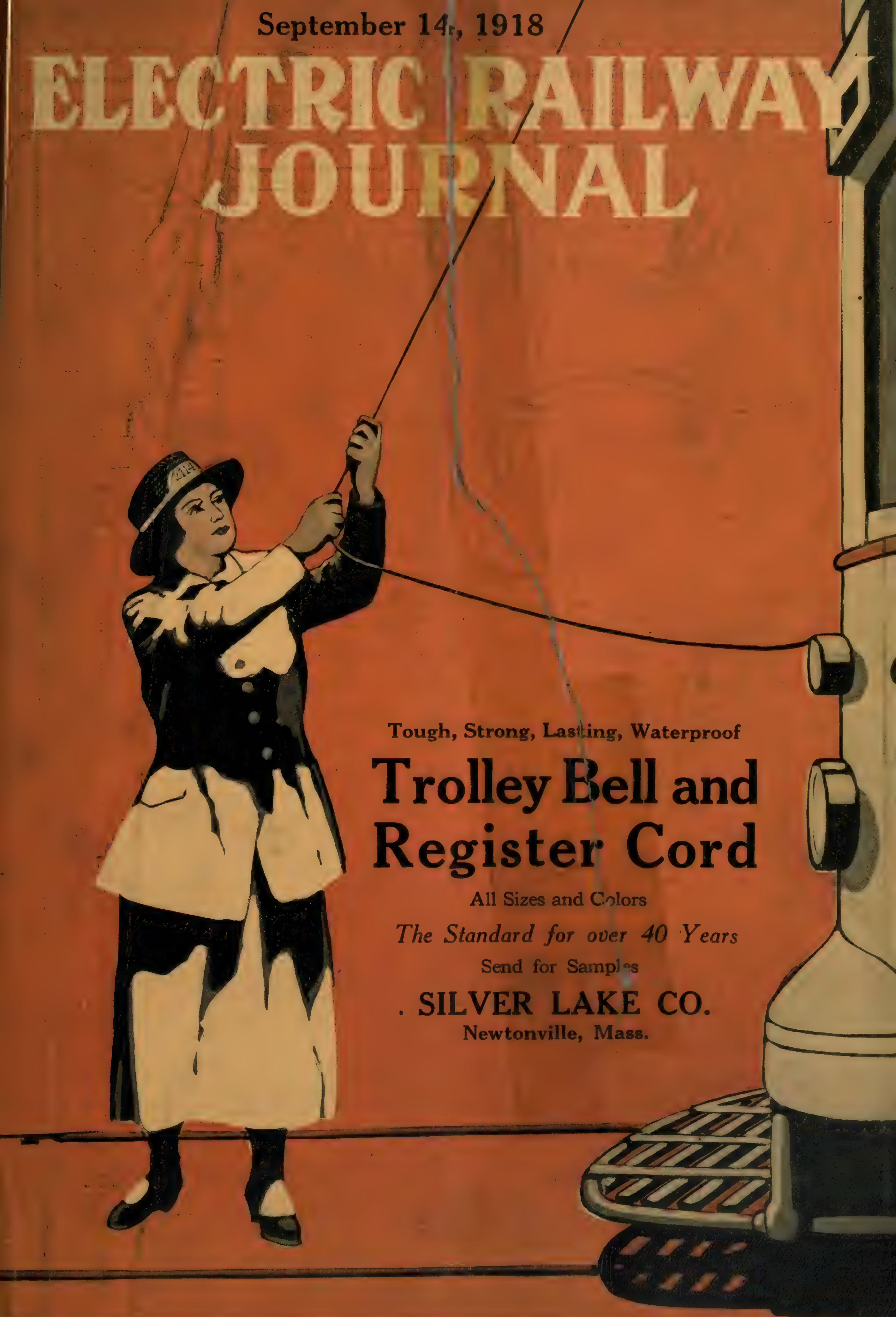
General Electric Company

General Offices:
Schenectady, N.Y.

Sales Offices
in all large cities

September 14, 1918

ELECTRIC RAILWAY JOURNAL



Tough, Strong, Lasting, Waterproof

Trolley Bell and Register Cord

All Sizes and Colors

The Standard for over 40 Years

Send for Samples

SILVER LAKE CO.

Newtonville, Mass.

Discussion

"Joe," said the General Manager to the Superintendent, "I want to go over with you the different things we ought to discuss with other railway men during our spare time at the coming meeting, so that we will be sure to cover everything."

"Well, Boss," answered Joe, "I have a memorandum of things I intend to discuss. Here it is:

(1) The great value of dipping and baking armatures and field coils.

(2) Putting up-to-date, heavy and reliable equipment on snow sweepers; also the value of snow sweepers.

(3) Putting tight covers on motors and controller boxes during snow storms.

(4) Instructions to car crews to prevent burning up motors and control, bucking snow.

(5) I think the pendulum for light-weight trucks and motors has swung too far in some cases. You know light-weight trucks and motors will not stand 100% overloading during rush hours.

(6) Skip-stop, activity. Type of signs used, etc.

(7) Zone-fare collection problems.

(8) Dispatching systems to prevent repeated gaps in service.

(9) Coal saving practices, with coasting, use of heaters, etc.

(10) In addition I have a number of other things to discuss."

"Joe," continued the General Manager, "that's fine. I expect to take up other important matters such as—the value and use of 'safety cars' in providing more rapid and frequent service. The Stone and Webster people will have a lot of information on these.

"The problem of handling the public is very important. We ought to get a lot of ideas on this subject from those who have honestly tried up-to-date publicity methods.

"The use of women as car crews—

"The increases in revenue as a result of increased fares, and a number of others. We should also tell everybody about the performance of HL control and Westinghouse 532-B motors. That lot of equipment saved our hides last winter when everything else went to pieces. I guess we will not have much time for recreation this year."

Westinghouse Electric & Manufacturing Co.

Sales Offices in
All Large American Cities

East Pittsburgh,
Pennsylvania

Vol. 52, No. 11 New York, September 14, 1918 Pages 445 to 486

Electric Railway Journal

H. W. BLAKE, *Editor*

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Advertising Indexes—Alphabetical 54; Classified, 48, 50, 52; Searchlight Section, 46, 47

Air Brakes for Every Service

"SAFETY" Car, Northern Texas Traction Co., Fort Worth, Texas, Weight, 14,000 lbs. Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers; automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.

Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.

TRADE WA MARK

Mexico City
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Pittsburgh, Pa.

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Brake Building our Business for a Lifetime

Trade-FARADOID-Mark Porcelain Insulators

Patented

No. 2-33

The design of these insulators is based on the following scientific principles:

If the common surface of two dielectrics conform to the direction of the Faraday tubes between their electrodes, and if the electrodes are properly formed, the highest insulation efficiency is obtained:

They are furnished in five sizes:
No. 2-22 for 22,000 Volt Service
No. 2-33 for 33,000 Volt Service
No. 3-44 for 44,000 Volt Service
No. 3-55 for 55,000 Volt Service
No. 3-66 for 66,000 Volt Service

See catalogue 6-A for dimensions and flashovers.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

W
WESTINGHOUSE ELECTRIC

No. 3-44

Westinghouse

Phono-Electric

For Curves and Crossings

The Houston Electric Company has some 4 miles of No. 00 Phono-Electric Trolley Wire which it is installing as the No. 0000 copper wears out on its main belt—especially at curves and crossings.

By employing No. 00 Phono-Electric the company will be using the same gage as it does on its other lines.

Thus there will be no need to continue indefinitely the use of different splicers and other overhead parts.

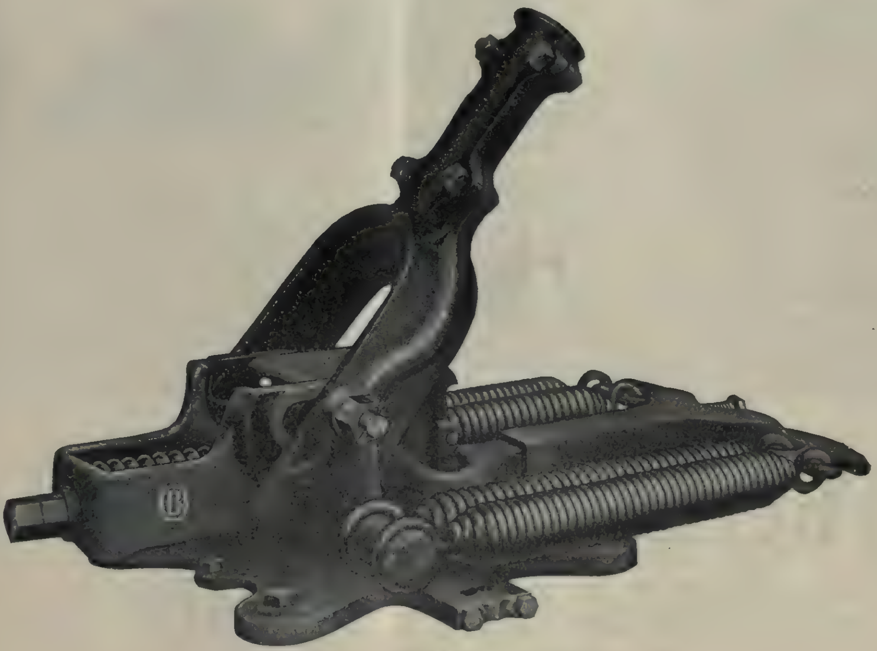
In other words, the reduced longevity of copper in heavy service can be overcome by using the standard wire gage Phono-Electric.

And No. 00 Phono-Electric costs less than No. 0000 copper.

Bridgeport Brass Company
Bridgeport Connecticut

O B PRODUCTS

Quality First



O-B Form 1 Trolley Base—Patented.

O-B Bases Complete—Balanced

There is not a single excess pound of weight in the O-B Trolley Base. Experience has proved that it is as light as an efficient, durable base can be made.

These are the features that make it valuable: Practically uniform pressure on the trolley wire at all angles of pole.

Roller bearing which cannot jam. Base swings freely on large area bearing.

Plentiful current carrying capacity.

Readily accessible for inspection of all parts.

Renewable steel bushings at all points of wear. O-B Base stays new.

Many a road has taken one O-B Base on trial and then sent in order after order for this Complete Base.

Try an O-B Base on your cars at our expense.

THE OHIO BRASS CO., Mansfield, Ohio

New York Chicago Pittsburgh Philadelphia San Francisco Los Angeles

Thermit at Los Angeles

Welds that Hold

This scene on South Main Street between Thirtieth Place and Slauson Avenue, (3 miles) Los Angeles, is one of several important Thermit Weld installations in that busy and beautiful city.

This particular installation was made in 116 lb. girder rail of 3 ft. 6 in. gage in 1913.

While not of the later Insert Weld type, the Thermit Welds in this work are giving excellent service as evident from the absence of trouble reports. No news in such cases is good news.

The Thermit Insert type of Weld we know will give you still better service in attaining

A Truly Continuous Rail.

METAL & THERMIT CORPORATION
Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.
120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco
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7300 So. Chicago Ave., Chicago
1427-1429 Western Ave., Pittsburgh, Pa.
Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

How to SAVE $4300 per Mile

[*Per* 100 *Feet of Track*]

Wooden Ties	
20 tie rods	$17.00
50 ties	42.50
100 tie plates	45.00
100 lb. spikes	4.00
28.3 cu.yd. concrete	165.56
34 cu.yd. excavation	42.50
Total	$316.56

Int. Steel Ties	
16⅔ steel twin ties	$116.66
134 cast malleable clips	10.72
15 cu.yd. concrete	87.75
15.2 cu.yd excavation	19.00
Total	$243.13

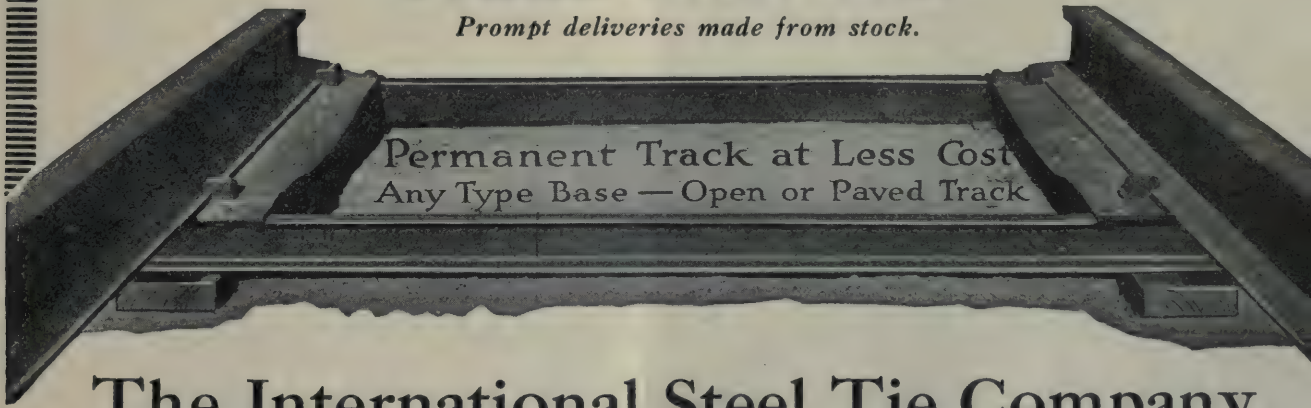
Saved per 100 feet $82.43
Saved per Mile of track.. 4352.30

And Besides: No tie rods; no tie plates; no cross bonds; narrow trench (7 ft. instead of 9 ft.); 50% labor saved in track construction below base of rail. Concrete foundations bear up well under heaviest traffic.

Ask us for proofs

INTERNATIONAL
STEEL TWIN TIES

Prompt deliveries made from stock.


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

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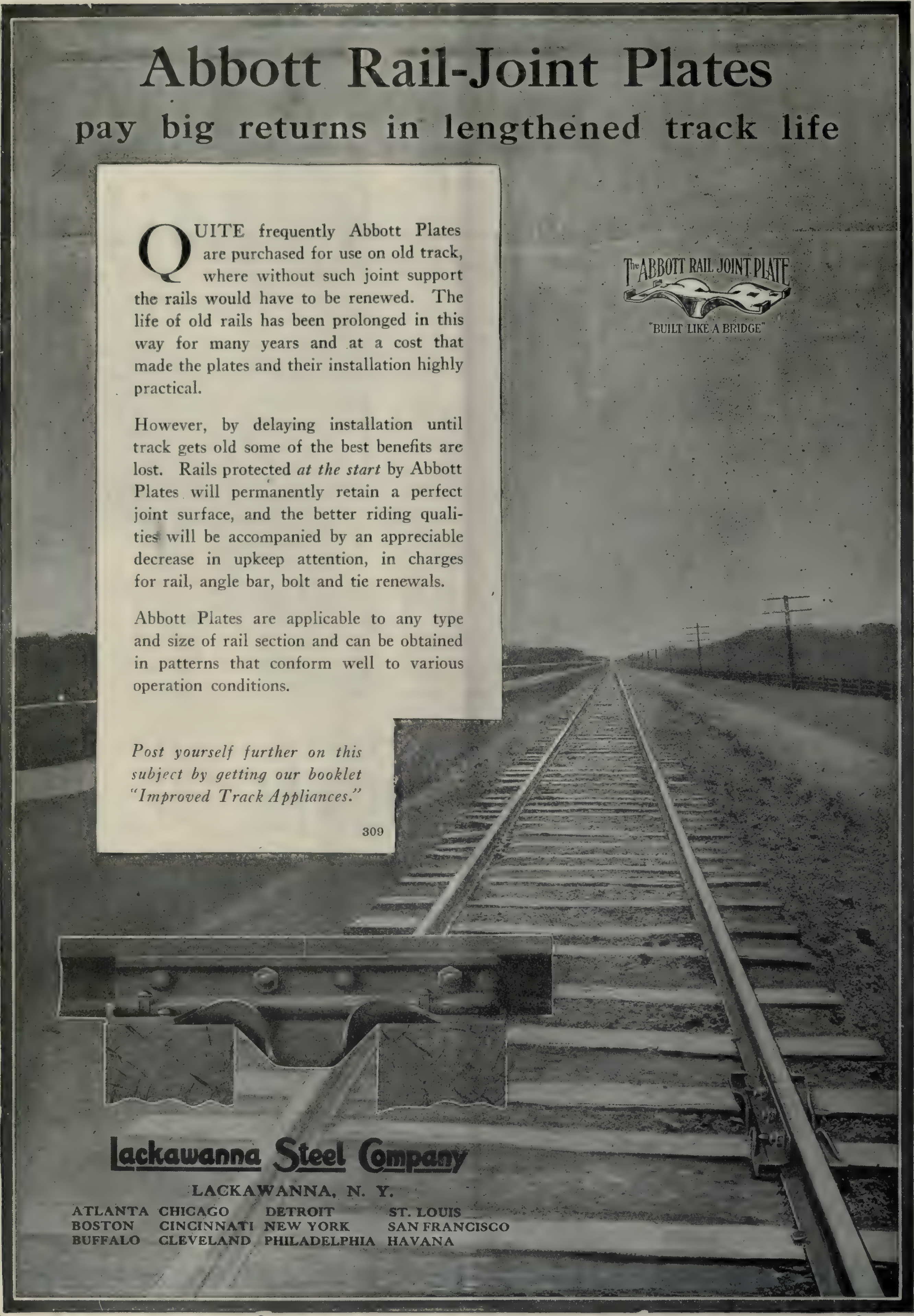

Abbott Rail-Joint Plates

pay big returns in lengthened track life

QUITE frequently Abbott Plates are purchased for use on old track, where without such joint support the rails would have to be renewed. The life of old rails has been prolonged in this way for many years and at a cost that made the plates and their installation highly practical.

However, by delaying installation until track gets old some of the best benefits are lost. Rails protected *at the start* by Abbott Plates will permanently retain a perfect joint surface, and the better riding qualities will be accompanied by an appreciable decrease in upkeep attention, in charges for rail, angle bar, bolt and tie renewals.

Abbott Plates are applicable to any type and size of rail section and can be obtained in patterns that conform well to various operation conditions.

Post yourself further on this subject by getting our booklet "Improved Track Appliances."

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Lackawanna Steel Company

LACKAWANNA, N. Y.

ATLANTA CHICAGO DETROIT ST. LOUIS
BOSTON CINCINNATI NEW YORK SAN FRANCISCO
BUFFALO CLEVELAND PHILADELPHIA HAVANA

"Protected" Rail Bonds

For Permanency

The "Shot-Over" Sleeves protect the strands right at the point where they need protection against vibration—at the terminal.

The strands being of pure lake copper give further protection.

Permanency is further aided by the soft, pure, ductile copper lugs which compress perfectly.

There are "Protected" bonds for every class of service.

You ought to use them.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

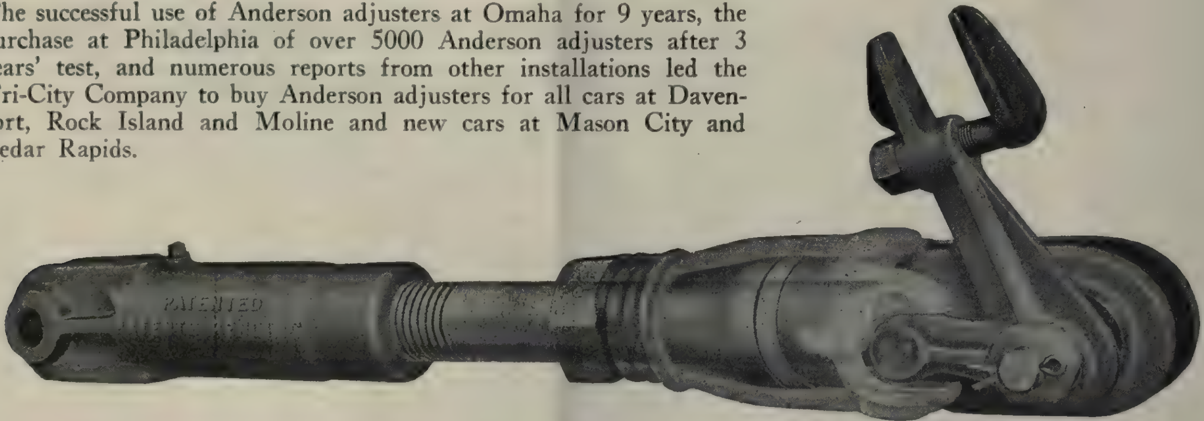
PHILADELPHIA **17th and Cambria Sts.**
NEW YORK **50 Church St.**
CHICAGO **Monadnock Bldg.**

Canadian Distributors: Lyman Tube and Supply Co., Ltd., Montreal, Toronto, Winnipeg

Tri-City Railway Orders Full Equipment of Anderson Slack Adjusters

The Tri-City Railway Company is always foremost in adopting efficiency devices. Officials of this Company recognized economies obtainable by having brakes automatically adjusted. They could foresee reduction of labor, saving in power, brake shoes, air and flanges.

The successful use of Anderson adjusters at Omaha for 9 years, the purchase at Philadelphia of over 5000 Anderson adjusters after 3 years' test, and numerous reports from other installations led the Tri-City Company to buy Anderson adjusters for all cars at Davenport, Rock Island and Moline and new cars at Mason City and Cedar Rapids.



What These Adjusters Accomplish

They enable a railway to remove one man per each 40 cars from setting brakes to do other useful work.

They make all car brakes alike and decrease collisions—reference to report sheets show the number of accidents due to slack brakes.

They save power by preventing dragging shoes. They maintain proper and constant clearance through the life of the shoe. Piston travel always remains the same irrespective of shoe and wheel wear, reducing compressor operation.

Anderson adjusters take the place of ordinary turnbuckles and can be installed on almost any truck in 30 minutes. They require no attention and are not affected by mud or ice. Moreover, they are not actuated by false slackness nor by worn pins, holes or journals.

Test Offer—We will place a test set of adjusters on any railway on request.
Send for data sheet and other information.

Holden & White Inc.
817 Fisher Building, Chicago, Ill.

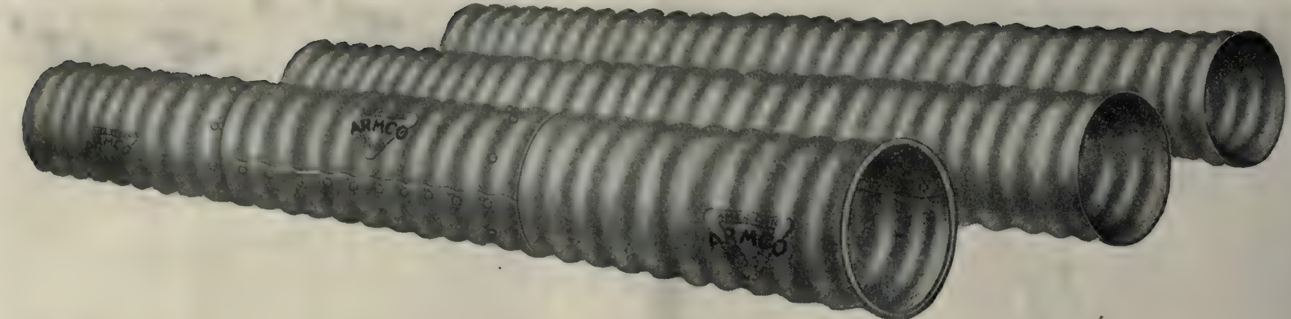
National Railway Appliance Co., New York and Washington; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles.

WESTERN RED CEDAR POLES

Picture No. 1 shows 65-foot **Western Red Cedar Poles** on Sanford Street, Muskegon, Mich., set in the fall of 1912. Lines of the Consumers Power Company. These poles carry on the top position an 8-foot arm with "3/0" wire. The second position carries "0" and "No. 6" wires.

The insert, picture No. 2, shows the line of the Arkansas Valley Interurban Railway Company, of Wichita, Kansas. This view taken near Newton, Kansas. **Western Red Cedar Poles.** They carry a 3-phase, 66,000-volt, 60-cycle transmission line; a 2300-volt, 3-phase, 60-cycle feeder; a 600-volt feeder to the interurban line of 4/0 wire; a 600-volt, 4/0 trolley wire, and 2 telephone wires.

Western Red Cedar Association, Spokane, Wash.



Three nice, new, shiny culverts

They look very much alike — when new. The temptation to buy the cheapest is strong —they look so much alike. Is there really any difference? Won't one give as good service as another? *Put them in the ground* and your questions will be answered for—

Time will tell

You can't fool old Father Time with doped metal or a shiny coat of spelter. Slowly, but surely, he searches out the weak spots and marks them with his red seal of rust. There *is* a difference in culverts and in order that you may know the best it is branded with this triangle trademark. You'll find "Armco" Iron Culverts in all parts of the country, as serviceable today as when they were first put in the ground. Indisputable evidence of their unequaled rust-resisting and enduring qualities will be gladly sent you on request.

AMERICAN
ARMCO
INGOT IRON

Write to nearest manufacturer named below for full information on "Armco" Iron Culverts, Flumes, Signs, Sheets Roofing and Formed Products.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
Iowa, Des Moines
Iowa Pure Iron Co.
Iowa, Independence
Independence Corr'd Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
The Kentucky Culvert Mfg. Co.
Maryland, Baltimore
The Maryland Culvert & Metal Co.
Massachusetts, Palmer
New England Metal Cul. Co.
Michigan, Bark River
Bark River Bridge & Cul. Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Michigan, Bay City
U. S. Bridge & Culvert Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.
Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
New Hampshire, Nashua
North EastMetal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Wks.
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Cul. Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal and Boiler Works
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
Virginia Metal Mfg. Co., Inc.
Washington, Spokane
Spokane Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Cul. Co.
Canada
Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.

"ARMCO" IRON RESISTS RUST

Hog Island's Get-There Train Service A National Pneumatic Triumph

To handle 'em quick and handle 'em safe was the wish of the Emergency Fleet Corporation in arranging for 100 cars to serve the Hog Island shipworkers via the Philadelphia Rapid Transit Company.

So National Pneumatic devices were adopted for these 100 train control cars as follows:

National Pneumatic Door and Step Control.
National Pneumatic Motorman's Signals.
National Pneumatic Safety Interlocking Door Control.

The Emergency Fleet Corporation wanted only the very best and in approving National Pneumatic devices it got them!

Why not follow Uncle Sam?

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York
515 Laflin St. Chicago

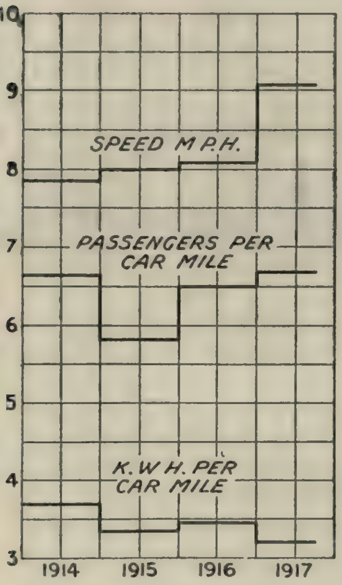
Can You Show Uncle Sam
Coal That

THE Fuel Administration's present campaign requires such a showing at the power house. Will it stop there?

What measure have you of your power consumption on each car that will show whether or not your power is being used economically?

Power consumption is coal consumption. Coal will win the war.

Electric railways should show that they are working to save power wherever possible. Power saving has a double value. First—The direct and immediate saving alone is worth while. Second—The evidence of co-operation is equally important.



Note the saving in energy made by the Tri-City System after installing Economy Meters on its cars early in 1915.

Save Coal by Saving Energy

Help your motormen to save coal by letting them see how much energy they use. The open-face dial of the Economy Meter shows the motorman just how much power he uses.

He knows that by saving energy he saves money, and few men are willfully wasteful.

Because the Economy Meter measures what he is trying to save, the motorman's interest is held and he *does* save.

Economy Electric Devices Company,

L. E. GOULD, Pres., Exclusive Sales Agen

Wetmore-Savage Co.
Boston, Mass.

Burton R. Stare Co.
Seattle, Wash.

Ludwig Hommel & Co.
Pittsburgh, Pa.

That You Need All The You Use?

The Economy Meter is the only device which measures car operating efficiency directly in units of energy consumption and that, in the final analysis, is the only real basis for accurately determining power saving.

It Meters the Energy and That's What You Want to Save!

The Economy Meter provides a record that saves money and that demonstrates efficiency and economy of operation.

The many ways in which the Economy Meter promotes efficiency are described in an illustrated booklet. Tell us to mail you a copy.

"The Watchdog of Your Power"

The ECONOMY Meter promotes more economical use of energy in car operation. It is easily installed by connecting in series with the car motors. It displays the car motor energy consumption on cyclometer dials like a fare register. These readings are the basis for checking the performance of motormen. Comparison of records induces sustained effort to excel.

Thus energy is saved.

Old Colony Building, Chicago, Ill.

Sangamo Economy Railway Meter

Rumsey Electric Co.
Philadelphia, Pa.

L. A. Nott
San Francisco, Calif.

J. G. Monahan
Los Angeles, Calif.

The Way the Reeds are Put in Make the Remmele Broom

"MAKES THE SWEEPER"

THE only broom on the market that will stand the strain and pounding at the high speed of 400 revolutions per minute made by the high speed sweepers; now used by one of the largest street railway corporations.

Last winter the Remmele broom was the only broom that stood the test in every respect. The reeds outlasted those of a dozen ordinary type brooms. It went through 24-in. snow banks and left the tracks and pavements clean, besides covering three times more ground. *It is the only broom that can be filled by machine in less than* 60 *minutes.*

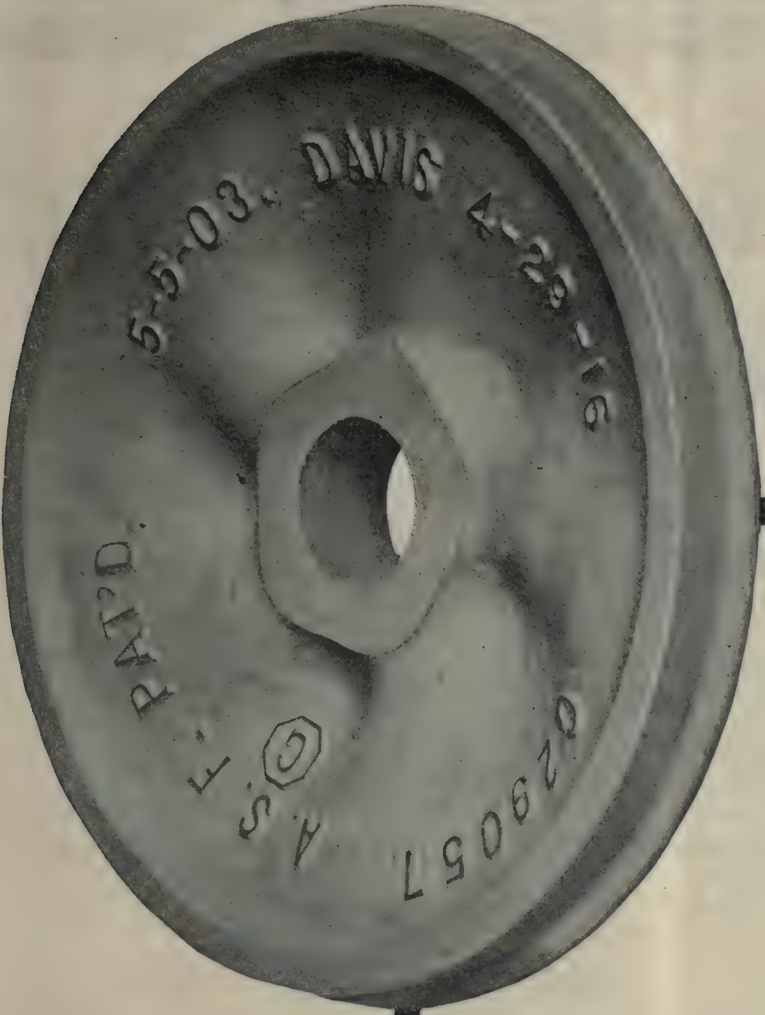
It is scientifically built, fool proof, simple and light, stands all the abuse of the rough roads, saves on reeds. It's so ingeniously constructed that it adds resiliency and toughness to the reeds so necessary to get efficient work.

It really saves on equipment. Your tracks are always in service and the schedules never disarranged. It does not make passengers and city officials disgruntled. You'll require less motormen and conductors for snow duty. The operating department and traffic managers will have no worry when snow falls, they'll be all smiles that they can save thousands of dollars in fares with open roads.

Can be used on your present equipment without change.

REMMELE & MAIER

370-372 So. Seventh St., Newark, N. J.



Take full advantage of Davis durability.

Get the utmost in good wheel service.

Davis One-Wear Steel Wheels were built for *your* railway—for speed, for safety and for long wear.

They will keep your cars "on the job".

AMERICAN STEEL FOUNDRIES
1100 McCormick Bldg., Chicago

DAVIS STEEL WHEELS

What you can next Liberty Loan

Read this carefully—then ACT

THE three Liberty Loan issues already successfully floated have been put over by the win-the-war spirit of the American people.

In connection with the great work of awakening and quickening to action the spirit of war sacrifice which has been the greatest factor in the success of Liberty Loans it would be impossible to put too high a valuation on the splendid voluntary work of American business men, bankers, labor leaders, and moulders of thought in all professions and occupations.

The very success of this volunteer leadership in creating enthusiasm has shown the desirability of organized methods for increasing its usefulness. And particularly to suggest to those leaders who feel that their circle of action is relatively small the enormous amount of good they can do as a whole *if each no matter how small or great (relatively) his sphere may be, will act with enthusiasm and system.* The great factory or store, society or club, church, or other organization with, say 5000 employees, members, or audience, does a great work in "selling" the Liberty Loan idea to such an aggregation. But that work is fully matched in aggregate importance by a hundred such institutions whose average payroll, membership, or audience, comprises only fifty persons each.

The nation has much other work to do. The Liberty Loan drives are necessarily carried through largely by volunteer work. In consequence they must be limited to specific brief periods for the actual subscription to the bonds.

THESE brief sharp campaigns have the advantage of building up white-hot waves of enthusiasm, but it is extremely difficult in such periods to secure close contact with *all* the wage-earning and money-making units of the public and especially to bring home personally to each individual the important serious personal relation which he or she should have to the war and to the successful financing of it.

To the accomplishment of that great end it is now proposed that the leaders of thought and action in America and especially the *employers of labor*, great and small, whether in store or factory, whether engaged in production or distribution,

hold a meeting of your employees shortly previous to the Fourth Loan campaign, not to take bond subscriptions but to arouse serious enthusiasm for the forthcoming Loan.

WHERE organizations are small, as for example small stores, similar organizations in the same or related lines of business can be invited to participate in one meeting. As for example, all the grocers in a small city, or all those in a given section in a large city, might get together in one meeting. But it would be a grocers' meeting. In such cases it would usually be wise to keep related trades together.

Whether the audience be great or small, every effort should be made to "stage" the meetings effectively, to make them interesting and instructive and above all to give *employees themselves* an opportunity to speak, to discuss, to suggest, to enthuse their fellow employees.

"Win-the-War" Meetings need not be limited to gatherings of employees. They can be equally effective if organized as "town meetings"—or by clubs, societies, churches, lodges or similar institutions. Leadership, organization, and a definite program will work wonders.

do NOW to help the

It is not essential that such meetings be *called* Liberty Loan meetings—they would better be announced as "Win-the-War" meetings, and above all it should be made clear that no attempt will be made at these meetings to secure or accept subscriptions for Bonds or money for any purpose whatever—but in all the speaking and discussion attention should be largely devoted to the forthcoming Loan.

The Fourth Liberty Loan Campaign will begin on September 28th.

All of the preliminary meetings should be held not earlier than September 10th and not later than September 25th, unless there are special circumstances which would make an earlier or later meeting expedient.

THE LIBERTY LOAN BUREAU has prepared a booklet setting forth "Suggested Programs for Meetings to Prepare for the Fourth Liberty Loan."

They have asked us as publishers of a business paper to bring this suggestion for patriotic service to the attention of our readers and to urge its hearty adoption by all stores, factories, employers of labor in any capacity, societies, clubs or organizations of any kind who can arrange such meetings.

We have been furnished with copies of the booklet giving "Programs for 'Win-the-War' Meetings"—and will send a copy promptly to anyone signing the coupon below and mailing it to us. The signing of the coupon is your pledge to hold such a meeting either of your employees or of some similar group which you can bring together previous to the Fourth Liberty Loan Campaign and your pledge when received will be turned over to the Liberty Loan Bureau and officially acknowledged.

Such meetings organized in the "Win-the-War" spirit will not only help tremendously to insure 100 per cent subscriptions to the Fourth Liberty Loan among employees of industrial and commercial concerns, they will do more than almost any other one thing could to develop among all ranks of the public the stern spirit of sacrifice and the necessity for loyal, constant, steady service of each and every one in the great national work of victory for the cause of Liberty and Democracy.

They will serve to educate and make clear to all the vitally important way in which work and sacrifice here in our midst help and sustains the work of our fighting men "over there."

This is an opportunity for every American business man to do a great and helpful work for the Fourth Liberty Loan and one which will help win the war.

There is plenty of time for efficient action. There is no time to lose in preparing for that action.

Electric Railway Journal

Sign the Coupon
Mail it to

Electric Railway Journal
10th Ave. at 36th St. New York City

Get the Book
Hold Your Meeting
and
make it a
"hummer"

This space contributed to the winning of the war by Electric Railway Journal.

I pledge myself to organize and hold a "Win-the-War" meeting previous to the opening of the Fourth Liberty Loan Campaign in order to help float the Loan.

Send me †........ copy of Liberty Loan Committee Booklet giving suggestions for Programs for such meetings.

Signature..

Position or Title..

**Firm*..

Street No...

City..

State..

Date..

* If a Society, Club or similar organization give name here.
† If more than one copy is desired state number.

TEXAS

Where They Have the Best They Have

H-B LIFE GUARDS

The San Antonio Public Service Company is meeting ably the great increase in business due to the great encampments nearby.

But the job is complicated by the large growth in other vehicular traffic and by the crowded streets busy with a war-swollen population.

These are conditions that call for every possible effort to minimize injuries from run-downs.

And these are conditions that called for the use of the one universal life-guard.

The Instantaneously-Acting H-B Life Guard.

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent
Wendell & MacDuffie Co.
61 Broadway, N. Y.

In 1885, at Cleveland, Ohio, an electric street railway was put in actual commercial service in the United States for the first time.

In that year three electrical roads with 7½ miles of track and 13 cars were put in operation in the United States and Canada.

Picture the Contrast Between These Old Cars and Those of Today

Compare the awkward designs with the graceful lines of today's cars; the small capacity per car with the load the modern car carries; the slow speed of '85 with the fast schedules of 1917.

Truly this American industry, only 32 years old, has made wonderful strides to the front.

Galena Oils

have done "their bit" in making possible these improvements.

For as greater loads, higher speeds and longer runs were adopted, better refining and compounding methods were evolved so that higher grade Galena Oils could be produced.

Galena Oils and Galena Service have shown an extremely high record of efficiency for nearly fifty years by always keeping a little ahead of the needs of the field.

Galena-Signal Oil Co.

Franklin, Pa.

Fourth Liberty Loan

The publishers of all business papers, including the Electric Railway Journal, have received over fifty pieces of approved advertising copy from the Treasury Department in Washington to be used in promoting subscriptions to the Fourth Liberty Loan.

It is hoped and believed by the government authorities that a very large number of manufacturers will wish to donate some of their advertising space in the business papers to the promotion of this Fourth Liberty Loan.

Advertisers in Electric Railway Journal who wish to devote some of their space to advertising the Loan can do so by promptly advising the publishers, who will select an appropriate piece of copy and publish it over the name of the manufacturer.

The copy is designed generally for full page display.

The issues of Electric Railway Journal in which the Liberty Loan advertising should appear are those dated September 28, October 5 and October 12, which will be published during the coming Liberty Loan drive.

Electric Railway Journal
10th Ave. at 36th St., New York City

Every 80 Pounds Of Coal You Save Makes Another 3-in. Shell

According to the Fuel Administration, 80 pounds of coal is enough to make a 3-in. shell. The same amount is equivalent, in electrical energy, to 27 kw. hours or enough to run a car of average weight 13½ miles.

Coast a mile a day on each car you have in operation and look what a big accumulation of patriotism and profit you will have at the end of the year.

Rico Coasting Recorders

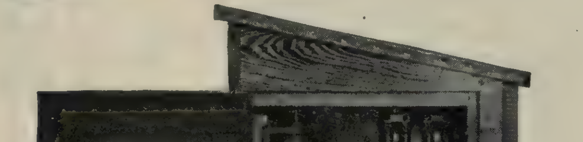
stimulate your men to coast by giving them an automatically printed record of the minutes they operate their car with power off and brakes off—the coasting time.

An indisputable evidence of their skill and ability to conserve COAL.

Time is the Essence of Railroadin

RAILWAY IMPROVEMENT CO. 61 BROADWAY, NEW YORK

Be Ready For The Crowds



When the factory whistle blows and the men pour out to the waiting cars be prepared for the heavy loads that will follow. Extra feeders will do it, but why go to this extra expense when there is another and more economical way! Just install

G-E Automatic Sectionalizing Switches

across your section insulators to take care of every increase in traffic automatically.

This switch when actuated by low voltage on one of the sections, connects the feeders in multiple for as long as the load conditions demand it. The advantages of both sectionalized and non-sectionalized systems are thus made continually available with consequent improvement in car service.

For more complete data write to our nearest office.

40-30

General Electric Company

General Office Schenectady, N.Y.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, September 14, 1918 *Number 11*

Support the Electric Railway War Board!

THE Electric Railway War Board, with its headquarters at the country's capital, is the national focus of the influence of the electric railway industry. It is striving conscientiously and with all of the power that the industry puts into it to discharge its obligations to the country and to the electric railways. It is your representative at Washington whether you are a member of the American Electric Railway Association or not. It needs support; financial, statistical, moral. Send in your subscription to the work; respond to requests for data; let the board know that you appreciate its efforts. Get behind the Electric Railway War Board! Push!

New Cincinnati Franchise Possesses Novel Features

"EVERY commercial enterprise, to be successful, must offer a reward—a reward of merit for efficient and economical management." In these words the attorney for the Cleveland Railway pointed out to the War Labor Board recently one of the defects in the much-quoted Tayler ordinance of Cleveland. The defect in question is the absence of incentive to efficiency in the Cleveland franchise, which practically guarantees a return on capital investment and leaves the responsibility for service to others than the company officials.

Members of the City Council of Cincinnati in approving a new ordinance would seem to have profited by the Cleveland experience. The Cincinnati measure follows modern lines in having a cost-of-service basis. It proposes to start with an initial fare of 5 cents with provision for readjustment upward or downward every three months as cost of operation dictates. The novel feature is the section which gives the company a declining rate of participation in the surplus gross receipts as the fare increases. In the case of a 5-cent fare or less, 55 per cent of any surplus gross receipts go to the reserve fund and 45 per cent to the company; with a 5½-cent fare the rates are 70 and 30 per cent respectively, and with a 6-cent fare 80 and 20 per cent. With more than a 6-cent fare the company does not share in the surplus.

It is probably visionary now to expect any surplus from a 5-cent fare, but under more normal conditions the company would at least have this inducement toward economy and efficiency. In this respect the proposed Cincinnati franchise differs from other recent traction agreements, and it is an indication that those who have to do with the making of such contracts have studied results in other cities and are thinking in the right direction.

Planning the Prepayment Loading Station

THE rapid increase in the number of industrial plants employing large forces of workmen is emphasizing to electric railway transportation department officials the many advantages of prepayment loading stations where large numbers of passengers must be interchanged quickly. The use of a loading platform, access to which by the passengers can be gained only by passing a turnstile collection booth is, of course, not a new idea. To a limited extent it has been used for years, particularly in connection with rapid transit lines, ferries and the old-time pleasure parks. Despite the fact that prepayment station design is not an art in its infancy, there are a few recent installations that would serve excellently as good examples of what ought not to be, if we may judge from some recent observations on the subject. To be successful a prepayment station must be so planned that all paths of passenger flow are as direct as possible and under no circumstances should they intersect. Nor, in a well-planned station, should the passenger stream cross operative car tracks. While, of course, space or other local restrictions may prevent the working out of the ideal plan in every case, a few minutes of careful thought and study in the design of such stations will save in the aggregate many hours of operating time and many dollars in claim department allowances, as well as make for a better satisfied riding public.

Let's Vote on the Charge for Milk and Other Supplies

THE experience at Buffalo on Aug. 20 with the popular vote on the fare to be charged on the electric railways in that city was so decisive as to suggest that the same plan could be followed to advantage as regards the price of other necessities. If a referendum is good for determining the charge for transportation, why cannot it be equally effective in regard to the prices at which food and other household supplies are sold? Heretofore, there has been supposed to be some relation between the cost of producing articles of this kind and the price which had to be charged for them. Such a rule, according to the Buffalo theory, may be all right when it relates to a reduction in price for the finished article, but it is a most absurd provision when its effect is to raise prices.

Hence, we strongly recommend that the citizens of Buffalo, having disposed of the question of electric railway fares in their city, take up the price of milk, which presumably in Buffalo as elsewhere was gone up 50 per cent in price during the past two or three years. Probably as many people consume milk as use electric railway transportation, and a reduction to the charge made before the war would greatly lessen the present high cost of living. If the farmers don't like it they can lump it. They probably made tremendous profits four years ago at the lower price and now will simply forego a portion of their present profits if they return to the former price. Again, statistics recently published by the United States Department of Labor show that the retail price of three different cuts of beef has increased from 65 to 82 per cent since 1913. This is another case where an election should be held to decide whether a lower selling price would not be more popular.

Why not also have a vote to determine the selling price of shoes? And another as to whether it would not be better next winter for the temperature not to go below zero, or to limit the snowstorms to one every two weeks? If a referendum is superior to some of nature's laws, why should it not be superior to others?

Every Issue of the "Journal" a Win-the-War Number

THE ELECTRIC RAILWAY JOURNAL is dedicated heart and soul to the winning of the war, sharing in this vital matter the spirit of the industry. Every article, every news item to be "available for publication" must pass the acid test. Publishers and editors are a unit on this point as on others affecting the policy of the paper. This policy is first to hold up a mirror to the industry so that it can instantly see itself reflected in the events of each week, and second to suggest to the industry and to the public an interpretation of what the mirror shows to be true. We believe that the war-time (as well as peace-time) duty of electric railways is to furnish good service, and that to do this requires co-operation of employees, public and owners. Especially now is it important that these three understand one another and their respective duties. This will be the keynote of every issue of this paper, in the endeavor to make each successive issue a better win-the-war number than the last. Sometimes the editorials and other articles may appear to be severely critical. We hope, however, that judged by the standard mentioned they will prove to be constructively helpful.

While each issue of the paper is, we hope, a patriotic issue there are occasions when a special win-the-war effort is justified. The Liberty Loan and W. S. S. campaigns are cases in point. For example, in last week's issue a new plan for use in preparing for the Fourth Liberty Loan is propounded. There is still time to send in requests for the booklets explaining this plan. This week a number of letters telling about successful plans used in the Third Liberty Loan Campaign are printed. With next week's issue copies of a new poster entitled "Hello! Liberty Speaking" will be distributed and sticker reproductions of this will be available at cost. We expect that millions of the stickers, which are primarily for use on correspondence, will be called for. As for the poster which will be sent with each copy of next week's issue, we suggest that each subscriber put his up in the place where he thinks it will do the most good. The issue of the paper for Sept. 28 will be a special "War-Service and Economy" issue in which some of the national aspects of electric railway transportation will be taken up.

It is a wonderfully inspiring thing to consider the electric railway industry as an integral part of our great national war machine, and the editors of this paper hope that each issue will produce a cumulative effect in intensifying the conviction on the part of all that it is so.

Are Electric Railway Employees Becoming More Courteous?

IN THE CARS of the New York, New Haven & Hartford Railroad the following acrostic is prominently displayed:

> Courtesy is a business asset, a gain and never a loss.
> Officers and employees, above all others, should be courteous.
> Use courtesy in all dealings with passengers, patrons and one another.
> Railroad men help their company by being courteous.
> This railroad believes in courtesy.
> Even the discourteous like to be shown courtesy.
> Smooth away life's difficulties by being courteous.
> You will find your value increased by courtesy.
> "Life is not so short but there is always time for courtesy."—*Emerson.*

This acrostic contains a great many suggestions and a perusal of it naturally leads to such questions as these: Is the campaign for greater courtesy on the part of electric railway employees producing results? Can such a campaign be conducted without "preachiness"? What are the conditions which must be overcome in such a campaign? What can be done to make courtesy campaigns on the part of electric railways more effective?

Railway managers who are not as successful as they would like to be in securing courtesy on the platform and elsewhere must realize that there is a general slump in the matter of politeness all over the country. This is due partly to slackness in home training and partly to immigration of men and women who have standards of politeness lower than our own. The class of labor which is available for platform service, particularly, is not as good as formerly. In addition, many of the men in the service are too old to change their ways, and suggestions to the effect that they be more polite do not appeal to them. This is especially true if the suggestions come in a form which looks like preaching.

It must be confessed also that not all managers set a perfect example in the matter of courtesy. In some cases there is one attitude toward peers and another toward subordinates. As the essential of courtesy is considerateness, example rather than precept is the better means for inculcating it.

Courtesy campaigns must begin with the children, and a tremendous work confronts us here. But it will take time to achieve results with the coming generation. In the meantime, when labor conditions permit, men notoriously discourteous should be eliminated from the service. Comments from passengers may well be encouraged, and men who are conspicuously polite should be informed that their work is appreciated. A manager of a large interurban property in the Middle West said a few days ago that one conductor in his employ is worth twice what the company can afford to pay him because passengers will go out of their way to ride with this man. May the time soon come when such men are the rule rather than the exception on electric railway properties!

The Substation Renders the Power System Flexible

AT PRESENT the substation is to many the most interesting part of the physical equipment of the electric railway because its rate of progress is greatest, even though this progress is hampered by war-time conditions. One reason for this is that the substation offers many opportunities for saving in several directions. Railways which have been called upon to furnish more service or to redistribute their service have utilized to the full the flexibility of power distribution made possible by the substation. The managers, possibly even more than the engineers, are following substation developments very eagerly under present conditions.

No matter whether railways generate or buy their power they must transform it, and continue to transform it. Three-phase, high-voltage power is standard for transmission, and low-voltage, usually direct-current, power for utilization. The connecting link is the substation, and it is highly desirable that electric railway men keep themselves posted as to its development. This explains why the ELECTRIC RAILWAY JOURNAL gives so much space to substation matters. Several short articles on the subject appear in this issue.

The highly-perfected modern substation is the result of a perfectly logical evolution which is now and then well worth review. The early railways were dependent for power upon small direct-current generators, of low voltage and therefore limited transmission range. Vast quantities of copper in feeders were necessary for even moderate power requirements in a restricted area. As soon as alternating current was a demonstrated success, which was fortunately almost simultaneously with the electrification of horse railways, the railway pioneers were quick to avail themselves of the chance which it afforded to lengthen their electrified lines. Alternating-current motors were employed to drive direct-current generators, as is still the practice under special conditions, but soon the motor and generator were combined into one machine, the rotary converter. This is one of the most perfect and valuable electrical machines which we possess. It renders the electric railway practically independent of distance from a source of power.

The rotary converter has, of course, gone through many metamorphoses. Designers have had to overcome such difficulties as these: (1) To force the machine to keep up or even increase its voltage with load, as was done by the use of compound field winding. (2) To utilize its ability (as a synchronous motor) to control the line power factor, as was done by varying the excitation. (3) To simplify the starting problem, as was done by using a separate starting motor, or arranging for starting from the alternating-current end without field, or finally by putting on special starting windings. (4) To eliminate the "hunting" or pulsating effect in the alternating-current circuit, as was done by using pole dampers. (5) To eliminate "sparking" on overloads, which was partially accomplished by means of commutating poles, and now special flash barriers are being used also. (6) To adopt the machine to high frequency (60 cycles), as has been accomplished through the combined operation of several principles already mentioned, together with increasing knowledge of design principles. The result of all this has been a machine which will withstand several times full load momentarily and which operates at remarkable efficiency. In fact the total loss in a well-designed rotary substation, including that in the transformers, is almost negligible.

And now comes the automatic substation with its practical elimination of the labor problem, so that a railway system (in normal times) can have as many substations as transmission economy demands. Thus is removed one of the last limitations in power distribution for electric railways, but it must not be forgotten that this is possible only because the rotary converter has been previously so highly perfected.

Only Two Weeks to Prepare for the Liberty Loan Campaign

TWO weeks from to-day the campaign for the Fourth Liberty Loan will begin in this country and will continue three weeks. It is our prediction that the American people will over-subscribe this loan as they did the three previous loans. They realize that the quickest way to defeat the Hun is to overwhelm him with a large military force, and this costs money which the proceeds of this loan will supply.

Just prior to the opening of the Third Liberty Loan campaign, we published an account of the methods used by a number of different electric railway companies to place the prior loan before their employees, and we give this week similar facts on the third loan from ten or more other important properties. This article shows that the railways can assist greatly in the sale of Liberty Bonds by helping their individual employees to finance purchases of bonds, as well as by advertising the merits of the bonds on their cars and in their waiting stations.

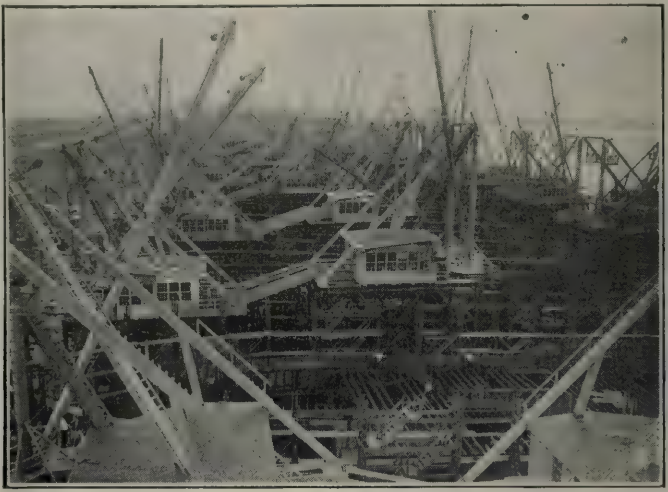
The American people realize to a greater extent than ever before that the war with Germany is a conflict in whose outcome each individual in this country is vitally interested. Each, therefore, whether he is rich or poor, employer or employee, has equal responsibility to do all that he can to win the war, and this includes a prompt response to all national calls for funds and man-power. Full appreciation of this fact will prevent a tendency on the part of anyone to shift the responsibility of making subscriptions to someone else, because of the belief that such a person is more concerned in the successful outcome of the war than he.

But employers have in one respect a greater responsibility in the coming campaign than employees—the responsibility which comes from their leadership. They should fulfill this obligation by acting as leaders in explaining to their men the present needs of the situation as well as the necessity for the success of the loan. They can also help in facilitating the purchase of bonds by their employees through a system of easy payments such as has been done by the companies whose practices are described in this week's issue. Each electric railway department can well aim for a 100-per cent record, and the same object could well be the goal of each individual company.

Hauling Shipbuilders to Hog Island—and Home Again

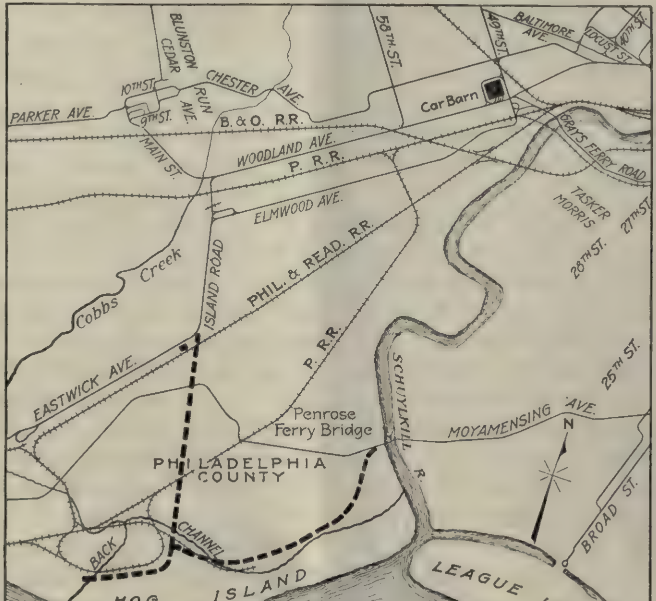
Electric Railways Play a Prominent Part in Solving the Transportation Difficulties at Uncle Sam's Big Plant—The Transfer of 30,000 Persons Each Way Every Day Presents Some Interesting Problems

Before



After

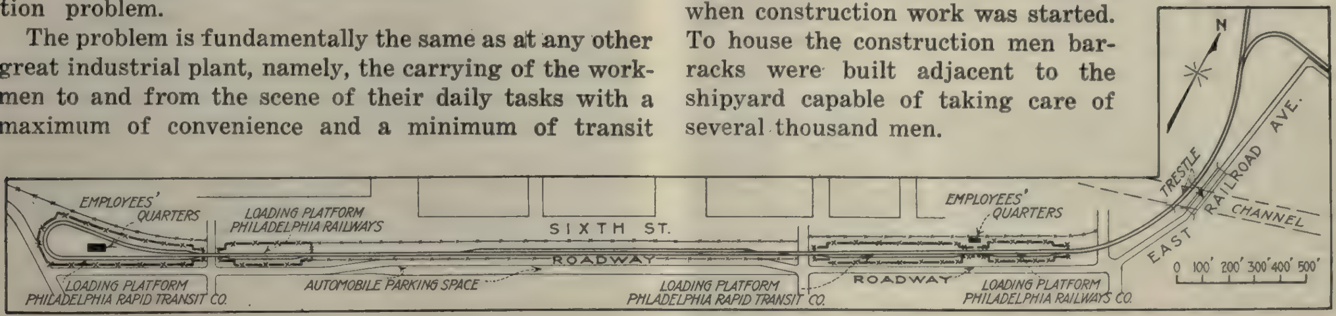
HOG ISLAND last September—and now! The change is almost unbelievable and in the peaceful days before the war would have been ranked among the greatest of engineering accomplishments. Hog Island is the name by which a low, marshy bit of land, about 900 acres in extent, lying along the Pennsylvania bank of the Delaware River just below Philadelphia, has been known for many years. It is some 7 miles, as the crow flies, from the City Hall in Philadelphia. As the narrow back water channel which formerly separated it from the main land has been filled in in several places it is no longer an island. At the time the American International Shipbuilding Corporation started work late last September, those portions of the island which were not marsh were covered with undergrowth and small trees. In ten months the land has been graded; some 75 miles of standard-gage track and many miles of highway have been constructed; sewerage, fire protection and electric power systems have been installed, and buildings, shops, shipways and all the rest of the vast paraphernalia necessary for the greatest shipyard in the world have been practically completed and put in working order. By the middle of July, thirty-six of its fifty-nine ways contained keels, some of the ships were rapidly nearing the time when they would be launched and towed to the great wet basin where twenty-eight ocean-going ships can be outfitted at one time, and on Aug. 4 the first ship was launched. Truly a remarkable accomplishment! The accompanying illustrations reproduced from photographs furnished by the shipbuilding company convey a good conception of the magnitude of the task.



MAP OF ELECTRIC LINES IN HOG ISLAND VICINITY SHOWING NEW EXTENSIONS

The yard, when in full operation, will be able to turn out a 7500- or 8000-ton steel ship every two days. It is the largest of the yards under the control of the United States Shipping Board's Emergency Fleet Corporation, the actual construction agent of this plant being known as the American International Shipbuilding Corporation. As might easily be guessed, the problem of transporting the army of employees, now numbering about 30,000, has not been a particularly easy one. Under the present trying conditions its solution has been made possible only by the complete co-operation of the Emergency Fleet Corporation and the electric railways concerned. Some details of the part which the railways are playing in its solution were published in the ELECTRIC RAILWAY JOURNAL, for Aug. 3, 1918, page 186. Details of the formal agreements between the railways and the Emergency Fleet Corporation have been printed from time to time. This article is devoted to the presentation of further details pertaining to the transportation problem.

The problem is fundamentally the same as at any other great industrial plant, namely, the carrying of the workmen to and from the scene of their daily tasks with a maximum of convenience and a minimum of transit time. The complicating circumstances in this case are the large number of passengers to be moved in a short time, the isolated location of the plant with respect to the main avenues of rapid transportation, the widely separated dwelling communities of the workers, the presence of other industrial plants in the territory served by the nearest electric lines and, by reason of war conditions, the difficulty of getting the material "wherewithal" of transportation. By this last is meant the equipment, power and labor necessary to establish electric railway lines and to operate them once they are established. In normal times these complicating circumstances would be, in the main, mere trifles. Not so in war times, however. Another idea of the magnitude of the problem can be gained from the statement that the increase in electric railway facilities alone for this one shipyard has cost nearly $3,250,000.


N
EMPLOYEES' QUARTERS
LOADING PLATFORM PHILADELPHIA RAILWAYS
SIXTH ST.
EMPLOYEES' QUARTERS
TRESTLE
RAILROAD AVE.
CHANNEL
EAST
ROADWAY
LOADING PLATFORM PHILADELPHIA RAPID TRANSIT CO.
AUTOMOBILE PARKING SPACE
LOADING PLATFORM PHILADELPHIA RAPID TRANSIT CO.
ROADWAY
LOADING PLATFORM PHILADELPHIA RAILWAYS CO.
0 100' 200' 300' 400' 500'

PLAN OF THE PASSENGER PREPAYMENT TERMINAL

THE WORKERS LIVE IN WIDELY SEPARATED DISTRICTS

It is indeed fortunate that the workers' hours of labor are not all the same. The staggering is such that the morning rush hour extends from 6 a.m. to 8 a.m. and the evening from 4.30 p.m. to 6.30 p.m. Within these periods sharp peaks occur at 7 a.m. and 5 p.m.

The districts in which the workers live are widely separated, one being almost directly south of the City Hall in Philadelphia, others in the northern, northwestern and southwestern parts of the city. In addition to these districts new housing facilities are being developed by the Emergency Fleet Corporation at two points along Elmwood Avenue (see map), and a number of houses in the vicinity of Sixtieth Street and Chester Avenue have been commandeered for shipyard employees. To transport these workers from their points of origin no direct facilities existed when construction work was started. To house the construction men barracks were built adjacent to the shipyard capable of taking care of several thousand men.

Last autumn the nearest steam railroad and the nearest trolley line were each about 1½ miles distant from the center of the island. The only transport facilities available were boats on the Delaware and one or two precarious marsh roads. As practically all construction material both for plant and ships had to come by rail, steam railway transport received first consideration. The American International Shipbuilding Company built the line shown on the map as connecting its interworks railway with the Philadelphia & Reading Railroad. The lines shown as belonging to the Pennsylvania Railroad are new extensions necessitated by the shipyard and other war industry developments.

While the steam railroad extensions solved the freight-haulage problem, the Emergency Fleet Corporation officials early realized that they did not constitute a solution to the problem of transporting the workmen to and from the plant. Steps were taken to secure such extensions and reinforcements of the near-by trolley systems, the Philadelphia Rapid Transit Company and the Philadelphia Railways as would enable them to take care of the traffic.

THE P. R. T. HELPS BUILD SHIPS

Of the two companies the first-named, with its great interconnected system of surface, subway and elevated lines, is by far the more important. As shown on the map, its nearest tracks were those traversing Eastwick

THE STORAGE YARD AT HOG ISLAND

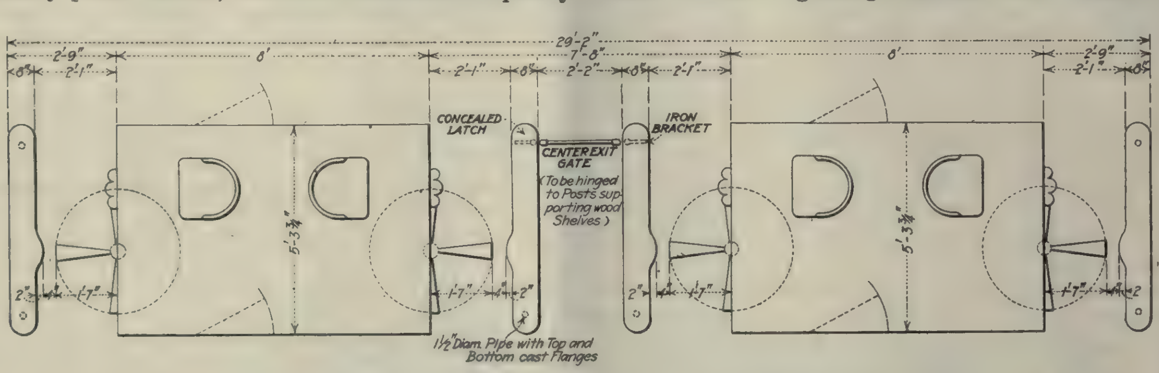
BEFORE THE ELECTRIC RAILWAYS STARTED OPERATION

STARTING ELECTRIC SERVICE AT HOG ISLAND

HAULING SHIPBUILDERS IN PHILADELPHIA

Avenue over which its Chester Short Line cars are operated. This line serves a number of industrial plants in the vicinity of Chester, Pa., notably the Essington works of the Westinghouse Electric & Manufacturing Company, the Eddystone Ammunition Company, the Baldwin Locomotive Works, and the Sun Shipbuilding Company, and even before the Hog Island development started carried a very heavy rush-hour traffic. A number of cars are operated as trippers between the industrial plants named and the carhouse at Woodland Avenue and Forty-Ninth St., the passengers from these cars transferring to some one of the lines intersecting the route of the Chester Short Line near the carhouse.

The new extension to the tracks of this company, which was officially opened on Aug. 3, and is shown by the dash lines on the map, is a double-track way along a newly opened extension of Island Road. The distance from Eastwick Avenue and Island Road to the shipyard property line, where the terminal loop commences, is about 9000 ft. A comprehensive scheme of power distribution system reinforcement, including new feeders, primary power cables, additional converter capacity in existing substations and a new substation at the junction of Eastwick Avenue and Island Road, has been worked out. To carry the passengers, 100 new large double-truck, double-end cars equipped with longitudinal seats have been purchased from the J. G. Brill Company. These cars, the main specifications for which were published in the ELECTRIC RAILWAY JOURNAL for March 16, 1918, page 552, are equipped with multiple-unit control for two- and three-car train operation. Most of these cars have been delivered, and it is expected that all will be in service by October.



GENERAL ARRANGEMENT OF THE PASSIMETERS AND BOOTHS

With the extension in operation some rerouting of existing lines has been necessary in order to avoid serious overloading of the cars on the Chester Short Line route.

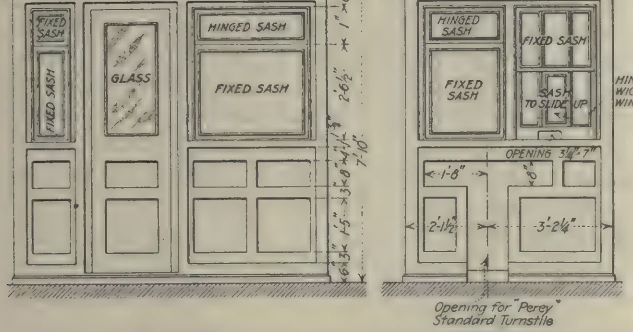
While the extension was under construction the company gave partial service to a large number of Hog Island employees through a shuttle steam line of the Shipbuilding Company which ran to Ninety-Fourth Street and Eastwick Avenue where the electric cars were boarded. The Philadelphia & Reading Railroad and the Pennsylvania Railroad also operated workmen's trains which carried from 8000 to 12,000 people to the terminal stations of these companies, from which about 50 per cent of the riders used the lines of the rapid transit company to reach their homes. It is estimated that the P. R. T. handled thus more or less indirectly some 15,000 employees of the shipyard before the extension was built. This number probably will be increased approximately 50 per cent when full operation of the new extension is reached.

One of the problems imposed by this heavy rush-hour traffic is that of getting sufficient train crews to operate the cars. While the company is fortunate in having for the groundwork of its operating force 50 per cent of the total normal number of trainmen who have been in its employ five years or more, the matter of getting extras for the peak period has been a most serious one. Just now it is using the part-time services of about 150 men who are regularly employed in other industries but who some time in the past have been employees of the railway company. These men give great assistance in caring for the Saturday and Sunday park and pleasure resort peaks. For the other days in the week clerks and general office employees of the company who volunteer for the work, together with some workmen who are free from their regular duties during the rush-hour periods, take care of the morning and evening peaks.

Until recently all employees at the shipyard not using the steam roads were either within walking distance or were carried by boats on the Delaware, by trucks or by private automobiles.

The Philadelphia Railways Carries Shipbuilders

As was noted in the news columns of the Electric Railway Journal for July 20, 1918, page 126, the other electric line operating in Hog Island vicinity, the Philadelphia Railways, started to give partial service into South Philadelphia on July 15. This company has a small suburban line with a terminal at Third and Jackson Streets, and thus serves a community in which many workmen live. The line crosses the Schuylkill River at the old Penrose Ferry Bridge. When first constructed the road branched just beyond the bridge, one branch extending in a westerly direction and paralleling for some distance the Chester Short Line of the Philadelphia Rapid Transit Company. The other branch meandered across the marsh to a ferry which crossed the backwater channel to Hog Island. Service on the latter branch was abandoned years ago although the old roadway still remained. This old branch has been rebuilt into a double-track line on a new highway extending from Hog Island to the Penrose Ferry Bridge and the entire line into Philadelphia has been greatly reinforced. The power system has been rejuvenated and thirty second-hand cars have been purchased for the Hog Island service. At Hog Island physical connection is made with the Philadelphia Rapid Transit Company line as both companies use the same terminal loop. When in full operation it is expected that this line will give service to approximately 7000 shipbuilders.



SIDE VIEW END VIEW

SIDE AND END ELEVATIONS OF COLLECTION BOOTH

A Prepayment Terminal Is Used at the Shipyard

This terminal is on government property and extends for nearly a mile along the back of the shipyard. Its tracks divide the government property into two parts; one between the river and the terminal containing the yard, the other the section occupied by steam railway terminals, hotels, workmen's barracks and other accessory buildings. As shown on an accompanying line cut, the terminal consists of a loop with two groups of loading and unloading platforms. These platforms are located with reference to the main entrances to the shipyard. The railways, while using the loop jointly, have separate loading and unloading platforms. The platforms used by the Philadelphia Rapid Transit Company contain each four double-gate passimeter booths, or thirty-two turnstiles in all. Of these one-half are on the loading platforms and the other on the unloading platforms where a post-payment fare is collected. The reason for this is that the line into Philadelphia has been divided into two 5-cent zones, the dividing line being at Eastwick Avenue and Island Road. A 5-cent fare is collected of passengers as they enter the cars going toward the shipyard. As the cars are crowded, a post-payment collection of the other zone fare seemed more advisable than an attempt to go through the car at the zone line. On the return trip a 10-cent fare is collected at the loading platform before the passenger enters the cars. As there are practically no stops between the terminal and the first zone limit any passenger leaving the car within the zone will have 5 cents rebated to him by the conductor. The procedure on the Philadelphia Railways is somewhat similar except that the post-payment fare is 3 cents and the total fare from the shipyard to any point beyond the Penrose Ferry Bridge is 8 cents.

The turnstiles are arranged in pairs, one on either side of the collection booth. From the booth the passengers proceed in two streams, one entering the front end of a car and the other the rear end. The employees, while giving some trouble at the start, keep in line very well. The excellent police system of the shipyard, of course, renders good service in this connection.

Special loading tracks are provided in front of the platforms so that loading cars may not obstruct traffic on the loop. Train sheds protect the turnstiles and platforms.

The terminal, with the exception of the overhead lines which were built by the Philadelphia Rapid Transit Company, was constructed by the American International Shipbuilding Corporation after plans drawn up by the rapid transit company with the co-operation and assistance of the transportation experts of the Emergency Fleet Corporation. It is hoped by the corporation officials that once the terminal is in full operation the steam roads will be relieved of caring for the passenger traffic.

Everybody Can Make Small Savings

S. G. McMEEN, president Columbus Railway, Power & Light Company, issued recently to the company's employees a little folder to enlist their co-operation in making small, as well as large, savings. Among his suggestions were these: "Remember that material is money. There are many ways of making small savings in all departments and these will have a large influence upon operating costs. Consider the following, for savings can be made in the ways suggested:

"A conductor threw away a broom when it was only slightly worn. A new one costing 63 cents had to be given him—a needless waste.

"A motorman dropped a vestibule window and broke the glass, when he might as easily have lowered the sash slowly. The glass cost 91 cents. Scores of them are needlessly broken every year.

"Trolleymen repairing the line left a coil of wire, which cost 15 cents a foot, beside the track. They only forgot to pick it up but they might just as well have thrown away several dollars in silver; the effect would have been the same."

Get Behind the Fourth Liberty Loan

Once Again the Electric Railway Industry Has an Opportunity to Show What Team Work Can Do in the Nation's Interest

THE CAMPAIGN FOR THE FOURTH LIBERTY LOAN begins on Sept. 28 and closes Oct. 19. Details as to the amount of the issue or interest or maturity had not been announced at the time this paper went to press, but in all probability the American people will be called upon to pour out more money in a shorter time than ever before. Rapid and efficient work, and prompt and liberal subscriptions, are therefore needed.

The news of the day gives inspiration for a great effort. The cracks in Germany's armor are hourly becoming more apparent, and it is only a question of time until a just and lasting peace can be secured. Germany is not invincible but highly vulnerable. The Huns are not yet defeated, however, and any suspending or even slackening of effort would be folly. Now, even more than before, the nation must stand united and firm.

Hence, push the Fourth Liberty Loan. The thorough, careful organizing of every part of the country to raise five or six billions of dollars is a mammoth undertaking, but it can be done. To help bring this about every electric railway, every employee, must feel individual responsibility. As described in the ELECTRIC RAILWAY JOURNAL of March 30 in the case of many representative companies and again in the following letters from additional leading companies not canvassed before, electric railways have exhibited a patriotic support of the previous loans, and the work will now be continued. But a 100 per cent subscription record for the employees of every company and for the industry—that's the record that should be made in the coming campaign!

United Railways, St. Louis, Mo.

RICHARD MCCULLOCH, *President*

Subscriptions to Liberty Loans by the employees of the United Railways have been made as follows:

First Liberty Loan, 788 employees	$39,500
Second Liberty Loan, 2679 employees	109,500
Third Liberty Loan, 4968 employees	270,800
Total, 8435 employees	$419,800

In the case of the Third Liberty Loan, every employee subscribed for at least one bond.

In some cases the bonds were paid for in full, but in most cases the company subscribed for the bonds in the name of the employees, the employees signing an agreement that they would pay a certain amount each month. The minimum payment was $2 a month for each $50 bond. In a number of cases, however, the employees voluntarily agreed to pay more than this minimum.

More than $60,000 of the bonds of the First and Second Liberty Loans have already been paid in full, and $35,000 of the bonds of the Third Liberty Loan have been paid for in full.

Where the employees have discontinued the payments, the company has taken over the bonds. There have been few cancellations by employees still in the service of the company.

The method of carrying on the Third Liberty Loan campaign was as follows: Each department and each carhouse appointed a committee to solicit loans. The advertising furnished by the national government was conspicuously displayed on the premises of the company and on the fronts of the cars. A sign indicating the subscriptions up to date was carried on the fronts of the buildings, and when any department succeeded in getting subscriptions from all of the employees, this fact was conspicuously advertised on the fronts of the buildings. The various committees were very energetic, and a great deal of enthusiasm was displayed.

Pittsburgh (Pa.) Railways

P. N. JONES, *General Manager*

For the former issues of Liberty Loan Bonds we did not carry window notices, posters or display cards in the cars, nor were there any parades held in which the railway could participate with the use of floats and similar advertising inducements.

"ACH. THEY'VE GOT OUR RANGE AGAIN"

In the case of the Third Liberty Loan we got a late start, as we had given some of the women's auxiliaries committees permission to collect the subscriptions of bonds in our several carhouses and in some of the shops. After they had had five days' collecting, we were asked by the central industrial committee, having charge of the loan in Allegheny County, to make a general canvass among the men ourselves. In the remaining time of the campaign we succeeded in obtaining 2500 and odd subscriptions for a total of about $150,000.

In the coming campaign we will use the same methods as formerly. Each shop and carhouse will have its own committee to take up the subscriptions with the original payment, which will be turned over to the designated banks by a general committee in the office. In this way at the time of the Third Loan we worked up considerable friendly rivalry between the operating, mechanical and way departments and in a great many instances had 100 per cent subscriptions.

We have given some consideration to either a wooden or a cardboard sign on which we will have painted two designs representing thermometers, one giving the number of employees in the department and the other the total amount subscribed. We believe these will induce our men to subscribe through the company and the general

The Nation Needs 100 Per Cent Record

Representative Companies Not Canvassed Before Report that Efforts Made in Preceding Campaigns Will Be More Than Equalled

industrial committee, and also keep the interest alive during the entire period of the coming campaign. Naturally, we will have meetings at the larger shops and carhouses with good speakers to explain the progress the nation has made in the war, as was done in the previous campaigns in Allegheny County.

With a company having as many carhouses as we have, we believe that friendly rivalry between the several points is the best method of arousing interest and "keeping all on their toes."

Puget Sound Traction, Light & Power Company, Seattle, Wash.

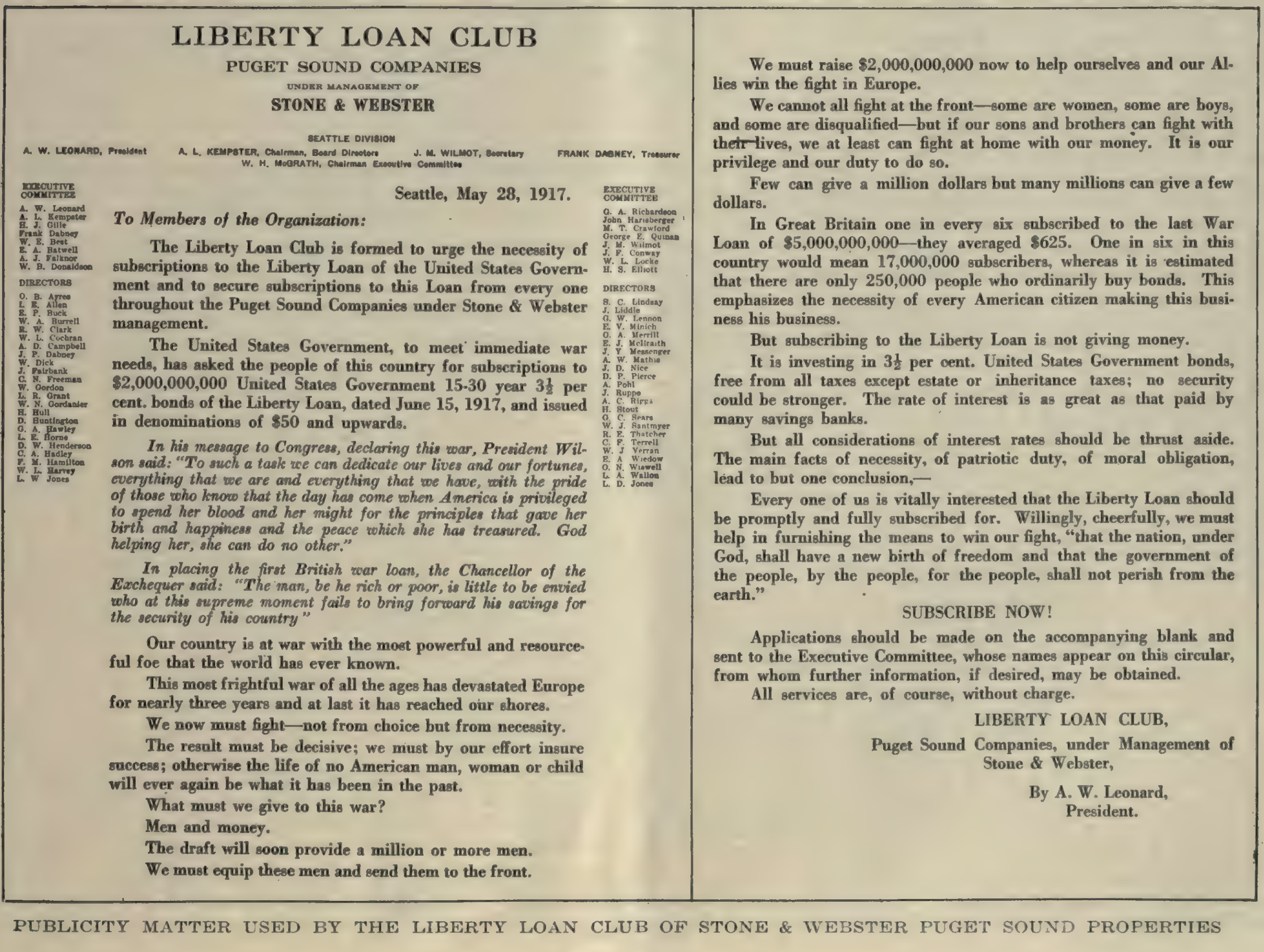
A. W. Leonard, *President*

The Puget Sound companies under the management of Stone & Webster formed a Liberty Loan Club to urge the necessity of subscriptions to the bonds. It was the desire of the club that as many employees of the companies as possible should avail themselves of the opportunity for patriotic service, and the club made the purchase of bonds an easy matter.

Under a plan arranged by the club payments by employees could be made as follows: Subscription was received from any employee, 10 per cent to be deducted from the next pay check succeeding the receipt of the subscription. Each month thereafter deductions were made at the rate of 10 per cent till the full amount of the subscription has been deducted. The final deduction included the adjustment of the accrued interest on the bond to the date of final payment.

In subscribing for bonds the employee was required to sign an order on the assistant treasurer to make the necessary deductions on the payroll and also a formal subscription blank authorizing the subscription for the bond in the denomination desired. Both forms could be secured from any department head or Liberty Loan Club director, any of whom were glad to answer any question regarding the plans and purposes of the club. The plan worked out very successfully for the First, Second and Third Liberty Loans and will be followed for the next one.

To interest the public we carried advertising matter inside of all cars. This matter was prepared by the local city Liberty Loan Committee. We also donated space in the local newspapers for the use of this committee.



LIBERTY LOAN CLUB
PUGET SOUND COMPANIES
UNDER MANAGEMENT OF
STONE & WEBSTER

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W. H. McGRATH, Chairman Executive Committee

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W. J Verran
E. A Wiedow
O. N. Wiswell
L. A. Walton
L. D. Jones

Seattle, May 28, 1917.

To Members of the Organization:

The Liberty Loan Club is formed to urge the necessity of subscriptions to the Liberty Loan of the United States Government and to secure subscriptions to this Loan from every one throughout the Puget Sound Companies under Stone & Webster management.

The United States Government, to meet immediate war needs, has asked the people of this country for subscriptions to $2,000,000,000 United States Government 15-30 year 3½ per cent. bonds of the Liberty Loan, dated June 15, 1917, and issued in denominations of $50 and upwards.

In his message to Congress, declaring this war, President Wilson said: "To such a task we can dedicate our lives and our fortunes, everything that we are and everything that we have, with the pride of those who know that the day has come when America is privileged to spend her blood and her might for the principles that gave her birth and happiness and the peace which she has treasured. God helping her, she can do no other."

In placing the first British war loan, the Chancellor of the Exchequer said: "The man, be he rich or poor, is little to be envied who at this supreme moment fails to bring forward his savings for the security of his country"

Our country is at war with the most powerful and resourceful foe that the world has ever known.

This most frightful war of all the ages has devastated Europe for nearly three years and at last it has reached our shores.

We now must fight—not from choice but from necessity.

The result must be decisive; we must by our effort insure success; otherwise the life of no American man, woman or child will ever again be what it has been in the past.

What must we give to this war?

Men and money.

The draft will soon provide a million or more men.

We must equip these men and send them to the front.

We must raise $2,000,000,000 now to help ourselves and our Allies win the fight in Europe.

We cannot all fight at the front—some are women, some are boys, and some are disqualified—but if our sons and brothers can fight with their lives, we at least can fight at home with our money. It is our privilege and our duty to do so.

Few can give a million dollars but many millions can give a few dollars.

In Great Britain one in every six subscribed to the last War Loan of $5,000,000,000—they averaged $625. One in six in this country would mean 17,000,000 subscribers, whereas it is estimated that there are only 250,000 people who ordinarily buy bonds. This emphasizes the necessity of every American citizen making this business his business.

But subscribing to the Liberty Loan is not giving money.

It is investing in 3½ per cent. United States Government bonds, free from all taxes except estate or inheritance taxes; no security could be stronger. The rate of interest is as great as that paid by many savings banks.

But all considerations of interest rates should be thrust aside. The main facts of necessity, of patriotic duty, of moral obligation, lead to but one conclusion,—

Every one of us is vitally interested that the Liberty Loan should be promptly and fully subscribed for. Willingly, cheerfully, we must help in furnishing the means to win our fight, "that the nation, under God, shall have a new birth of freedom and that the government of the people, by the people, for the people, shall not perish from the earth."

SUBSCRIBE NOW!

Applications should be made on the accompanying blank and sent to the Executive Committee, whose names appear on this circular, from whom further information, if desired, may be obtained.

All services are, of course, without charge.

LIBERTY LOAN CLUB,
Puget Sound Companies, under Management of
Stone & Webster,
By A. W. Leonard,
President.

PUBLICITY MATTER USED BY THE LIBERTY LOAN CLUB OF STONE & WEBSTER PUGET SOUND PROPERTIES

Portland Railway, Light & Power Company, Portland, Ore.

C. N. HUGGINS, *Treasurer*

The campaign for handling the Third Liberty Loan among our employees was supervised by the treasurer. This official appointed a campaign manager, selected for his special ability in such matters, to select committeemen for soliciting subscriptions from employees in the various departments. Committees of three were appointed at each of our four carhouses, and smaller committees at the various shops, power plants and headquarters buildings for maintenance-of-way, office and other departments.

These Men Are Doing Their Part—
Let Us Do Ours

Prior to the solicitation of subscriptions, these committeemen were brought together and fully instructed by the campaign manager and the treasurer in the methods to be followed, and were made familiar with all conditions of the bonds, manner of payment, etc. Upon the date when subscriptions began, these committeemen devoted their entire time to active solicitation until the job in their particular departments was completed. In most instances this work was finished in twenty-four hours, although at the carhouses, shops, interurban railway points and maintenance-of-way headquarters two or three days was required, it being a part of the plan that every individual employee should be solicited.

In the Third Loan campaign our company made installment terms somewhat different from the government terms in order to spread the payments more conveniently over the period. These terms were cash with subscription, 10 per cent; deductions from May payroll, 20 per cent; deductions from June payroll, 20 per cent; deductions from July payroll, 20 per cent; deductions from August payroll, 20 per cent; deductions from September payroll, 10 per cent. Interest on the deferred balance was charged at the government rate of 4¼ per cent. Regular employees so wishing were permitted to make their payments at the treasurer's office in cash instead of by deductions from payroll. All handling of the subscriptions after these were received and turned in has been done by the treasury department. The success in the third and prior drives was very gratifying, and we expect to follow practically the same plan in handling future loans among employees.

In the matter of advertising Liberty Bonds to the general public, we followed no special program, merely displaying posters and advertising cards furnished by the United States Treasury Department.

Michigan Railway, Jackson, Mich.

J. W. GLENDENING, *Treasurer*

In connection with Liberty Loan campaigns we send out to all the employees a circular, soliciting the purchase of bonds and advising that the company will carry these and make deductions from wages as follows: 10 per cent of the total amount of the bond on the first payday after subscription, and 5 per cent each pay day thereafter until the bond has been paid for.

We have found that the number of bonds purchased by the employees has increased considerably for each issue, and we expect to carry out a similar plan for the fourth issue. We anticipate that subscriptions to this issue by the employees will be considerably larger than for any previous subscription.

In order to reach the public also we carry on our cars and place in our stations posters furnished to us by the Liberty Bond committees.

United Railways & Electric Company, Baltimore, Md.

T. A. CROSS, *President*

The company purposes to conduct an energetic campaign among its employees for the Fourth Liberty Loan, and all the employees have been requested to make their subscriptions exclusively through the company. As shown by the announcement reproduced herewith, the company wants a 100 per cent record among its employees.

THE UNITED RAILWAYS & ELECTRIC CO., OF BALTIMORE

"WE WANT A 100% RECORD"

Baltimore, Md., September 4, 1918.

TO EMPLOYEES OF THE UNITED RAILWAYS & ELECTRIC COMPANY:

As you are doubtless aware, the FOURTH LIBERTY LOAN is about to be launched by our Government to provide the sinews of war. The three Loans previously issued met with glorious success, and it is essential, in order that the German Imperial Government may know that American people are unwavering in their determination to bring about a speedy and successful termination of this world-wide conflict, that every citizen of the United States embrace the privilege of subscribing to the forthcoming Loan.

This Company proposes to conduct an energetic campaign among its employes, and all are requested to make their subscriptions exclusively through the Company. We want every United employe to buy a FOURTH LIBERTY LOAN BOND. WE WANT A 100% RECORD; our country needs a 100% record.

Hundreds of our boys are in the military service "Over There," and it will be of immeasurable comfort to them to know that their fellow-employes "Over Here" are in every respect UNITED behind them.

T. A. CROSS,
President.

New Orleans Railway & Light Company, New Orleans, La.

H. A. FERRANDOU, *Treasurer*

The previous Liberty Loan campaigns were handled by making a canvass of the general offices, carhouses, powerhouses, shops, etc., to obtain subscriptions from employees.

The subscriptions were paid by deducting from the payrolls semi-monthly $2 for each $50 bond subscribed for, and the amount so deducted was turned over to the banks through which the subscriptions were placed. As the bonds were paid for they were turned over to the subscribers.

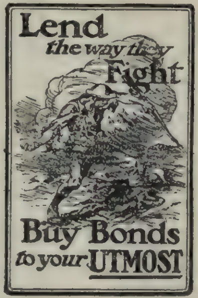
The plan we will follow in the next campaign has not yet been determined, but it probably will be the same as the past one, for this has proved very successful.

Utah Light & Traction Company, Salt Lake City, Utah

H. F. DICKE, *Manager*

As to the method followed in previous Liberty Loan campaigns, we made it a point to have someone solicit a subscription from substantially every person in our employ. The company arranged to purchase bonds for our employees in the sum of total subscriptions and then permitted employees to pay for their subscriptions on the basis of 10 per cent per month. We found that this permitted practically every employee to subscribe for at least one $50 bond and many of them for two or three of such bonds. We purpose to follow this same plan for the fourth campaign.

With respect to advertising, we co-operated with the advertising committee of this city in sending out a street car several hours during the middle and at the close of each day of the campaign. This car had large posters on each side of it. On several occasions a band was taken out in the car.



Denver (Col.) Tramway

J. C. DAVIDSON, *Publicity Manager*

In past Liberty Loan campaigns tramway employees could subscribe for the bonds either through the company or through one of the banks. The tramway terms were the same as those of the banks—that is, $5 a month with interest on a $50 bond, $10 a month with interest on a $100 bond, etc. This plan was very successful, and we are going to handle the Fourth Liberty Loan in the same manner.

Car cards, posters and dashboard cards (large cardboard signs on the front of all cars) were used exclusively. In order to make them more conspicuous the posters were printed in blue ink with a red border on white paper. We also devoted an issue of our bi-weekly publication to the public, *Tram-O-Grams*, to this work.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

S. B. WAY, *Vice-President and General Manager*

All employees of the company, in previous Liberty Loan campaigns, have been individually canvassed by members of the company Liberty Loan committee. These committeemen were appointed from each department, the number being proportionate to the number of employees in each department. Each employee was canvassed and the advantages of the security offered, as well as the opportunity given to participate in helping the government, were pointed out.

In view of the limited resources of a large proportion of the men, we considered the campaign eminently successful. On the basis of this experience, we presume that the same plan will be followed in the campaign to be undertaken beginning Sept. 28.

We carried dash signs and car cards in the cars, and employed posters on all company property. We also distributed Liberty Loan literature to our employees.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

ROBERT I. TODD, *President*

In the previous campaigns, on account of the unfortunate conditions prevailing in Indianapolis because of our inability to secure an increased rate of fare and, consequently, to grant increases in wages to our employees which would enable them to subscribe to any great extent to the several Liberty Loans, it was impossible for us to take a very active part in pushing the sale of bonds.

On the interurban lines posters were distributed over the various divisions and placed in all stations and waiting rooms; stenciled signs were used on the windows of the cars and stations; and committees were formed to secure subscriptions from employees. On the Indianapolis city lines we organized committees of inspectors, carhouse foremen and representative employees, who went out and solicited subscriptions from the trainmen, carhouse, shop and power station employees. Posters were placed on the billboards on the front dash of the city cars, signs were stenciled on the car windows, and space in the Traction Terminal station was utilized for large poster advertising furnished by the government.

Lend Him A Hand

We felt that in view of the conditions under which we were operating the amount of subscriptions secured through the company's committees was most favorable. We have made no definite plans in regard to the campaign which will begin on Sept. 28, other than probably to follow very closely along the lines mentioned above.

Ohio Electric Railway, Springfield, Ohio

H. G. GILPIN, *General Manager*

Previous Liberty Loan campaigns have been handled throughout this neighborhood without special offer on the part of this company to its employees of these bonds. We have had a number of men, however, purchase bonds throughout the district covered, buying in their respective localities as the homes of our men are scattered over a large territory. We have had Liberty Loan posters displayed in our stations throughout the entire property.

Engineers Get Together on Standard Car Design

Significant Meeting of Experts Was Held at Washington at the Request of the United States Housing Corporation

A MEETING of a number of railway car builders and transportation experts was held at Washington, D. C., on Sept. 12 for the purpose of considering the designing of a new type of standard electric railway car. The experts were called together for conference at the suggestion of O. M. Eidlitz, director United States Housing Corporation. He asked E. C. Faber, manager of the War Board of the American Electric Railway Association, to bring the experts together in the hope that they might be able to assist in designing a car which would be interchangeable among the electric railway lines of the country. Such use would be as a war measure.

Following are the names of the men who participated in the conference: A. L. Drum, consulting engineer, Chicago, Ill., at present associated with the Philadelphia Rapid Transit Company; Gardner F. Wells, manager transportation division United States Housing Corporation; Garrett T. Seely, assistant director transportation and housing division United States Shipping Board; H. H. Adams, superintendent of shops and equipment Chicago Surface Lines; J. H. Hanna, vice-president Capital Traction Company; John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway; C. O. Birney, Stone & Webster and American Car Company; M. B. Lambert, assistant manager railway department Westinghouse Electric & Manufacturing Company, and J. F. Layng, General Electric Company, now serving with the United States Fuel Administration.

At its meeting the conference committee elected Mr. Drum as chairman, and proceeded thoroughly to discuss the requisites in a standard car of the type desired. As a result it was decided to commit the details of the design to a sub-committee shortly to be appointed. This subcommittee will at once take up a thorough analysis of the subject and prepare a report for consideration by the conference committee at the earliest possible moment.

National Safety Council Report

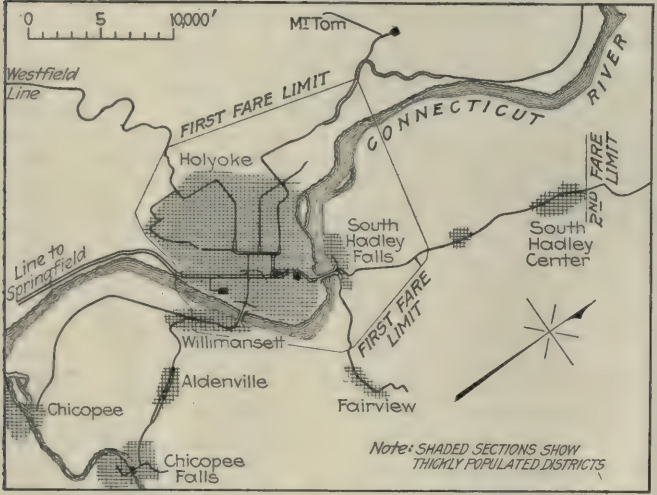
General Manager W. H. Cameron, who directs the activities of the National Safety Council, has presented to the members his annual report. It shows an income for the year of about $120,000, invested funds of about $17,000 and cash in bank of $7,000. During the fiscal year ended July 31 the membership increased by 306 to a total of 3606. This included 16,000 representatives and 6,000,000 employees.

Why Holyoke's Zone Fares Are Insufficient

Commission's Amendment of Company's Request Brings Only $55,000 Annual Increase—More Revenue Obtainable Without Raising Base Fare of 5 Cents—Important Factory Shut-Down and Loss of Young Men Reduce Riding

On Feb. 17, 1918, the Holyoke Street Railway inaugurated a fare system based on one 5-cent fare for the inner zone or any one zone with two 5-cent cash fares or six-for-40-cent tickets (6⅔ cents) for two zones for one group of lines, and two 5-cent cash fares or forty tickets for $3 (7½ cents) for another section of the system. The first group consists of the lines to Springfield, Chicopee Falls, Chicopee, Fairview and South Hadley Center, and the second section, the lines to Westfield and Smith's Ferry.

The tickets on the Westfield line are good only between the hours of 5.30 and 7.30 in the morning, and 5 and 7 in the evening and are not good on Sundays and holidays. The six-for-40-cent tickets are purchaseable from the conductors on cars. The Westfield and Smith's Ferry tickets are purchaseable at the office of the company. The company also issues tickets in books of 100 for $5, good in any one zone except on the Amherst and Sunderland division, where the unit of fare is 7 cents. Books containing ten and 100 tickets for school children are sold at 2½ cents a ride in any one zone, except on the Amherst and Sunderland division, where they are 3½ cents and good for a ride in any one zone. School tickets are purchaseable only at the company's office, and children purchasing these tickets are required to have a certificate from the superintendent of schools.



MAP OF HOLYOKE SYSTEM SHOWING ZONE FARE LIMITS

The fare from any point to any point within the first fare limits is 5 cents, and that from any point within the first fare limits to any point up to the second fare limit on the Chicopee, Chicopee Falls, Springfield and Fairview lines is two 5-cent cash fares, except that tickets are sold at the rate of six for 40 cents which give the same ride as two 5-cent fares, as described in the article.

Full details of the old and new Holyoke fare systems appeared in the ELECTRIC RAILWAY JOURNAL for Jan. 12, 1918. The zone diagram on page 458 is reproduced from the earlier article.

In making application for a fare increase the company had presented a schedule which on the basis of industrial conditions then existing was expected to increase the gross revenue by 20 per cent or $135,000 per annum. The changes made by the Massachusetts Public Service Commission reduced the estimated relief to $110,000, and the actual result has been an increase at the rate of only $55,000 per annum. This compares with a former normal annual increase of $30,000 to $35,000 or about 5 per cent of the gross earnings.

As shown in the zone map, the rates of fare are certainly extremely low. For 5 cents a passenger can ride with or without a transfer anywhere within a 2-mile or greater radius of the City Hall of Holyoke, which means a possible ride of 4 miles. In addition, a ride to Mountain Park, 4 miles from the City Hall, is obtainable for 5 cents. This exception was made so that the people of Holyoke could ride to this park for one 5-cent fare. There are also 5-cent inner zones in Chicopee Falls and other communities but these are of relatively small importance.

In general, about 50 per cent of the riders still pay only 5 cents.

DRAFT AND LABOR LOSSES IMPORTANT FACTORS

For the disappointing showing in revenue there are reasons sound enough and important enough to indicate that it is not due to any dislike of the zone system. In fact, the majority of the people favor it. The few malcontents are to be found chiefly in Fairview where the 6⅔-cent ticket or 10 cents cash has replaced an 11-mile ride for 5 cents, and also among suburban realty owners who had capitalized the ruinous 5-cent fare for their own benefit.

The principal causes for the decrease in riding as indicated by the accompanying tables are these:

The withdrawal for army service of 5000 to 6000 men out of a population of 100,000. As these men are between the ages of 21 to 30, they were obviously the best spenders, and accounted in that respect for, say, 12 per cent of the outgo of the community. Their absence has been felt not by the railway alone, but by the theaters and other places of amusements.

The increased cost of the longer rides has discouraged pleasure travel, which is quite a feature in this picturesque territory. Of course, the loss of this kind of travel can be borne with some equanimity since it is the short-haul rider, the backbone of the electric railway, who has had to subsidize the long-haul rider.

The voluntary and involuntary economies which the thrift campaigns and the increased cost of living have fostered.

Finally, the reduction of the working force of the Westinghouse factory at Chicopee Falls whose employees, 1200 to 1500 in number, rode back and forth over the lines of the company.

For the first twelve days of the zone system, Feb. 17 to 28 inclusive, the receipts on the Holyoke Street Railway increased $346.10 over the corresponding period of 1917 or $28.84 a day. Against this, however, was

TABLE I—SHOWING PASSENGER REVENUE, CAR-MILES AND EARNINGS PER CAR-MILE OF HOLYOKE STREET RAILWAY FOR FIRST THREE MONTHS OF 1918

	January						February						March					
Lines	Passenger Revenue in 1918	Increase Over 1917	Car-Miles, 1918	Increase Over 1917 Cents	Earnings per Car-Mile, Cents	Increase Over 1917	Passenger Revenue in 1918	Increase Over 1917	Car-Miles, 1918	Increase Over 1917	Earnings per Car-Mile, Cents	Increase Over 1917 Cents	Passenger Revenue in 1918	Increase Over 1917	Car-Miles, 1918	Increase Over 1917	Earnings per Car-Mile, Cents	Increase Over 1917 Cents
Route 1.....	$7,285	*d*$550.55	18,570	*d*1,217	39.23	*d*.37	$6,334	*d*$1,011 85	16,809	*d*865	37.68	*d*3.93	$6,751	*d*$1,111.61	19,126	*d*1,730	35.30	*d*2.40
Route 2.....	13,217	64.30	33,665	*d*2,517	39.25	2.91	11,880	1.70	31,049	*d*1,768	38.26	2.06	13,437	203.06	35,148	*d*2,173	38.23	2.77
Route 3.....	2,518	592.24	8,010	*d*39	31.44	*d*2.49	2,345	624.76	7,287	86	32.18	8.29	2,411	488.05	8,105	132	29.75	5.61
Route 4.....	4,429	*d*868.40	16,960	*d*6,182	26.12	3.23	4,081	*d*568 44	15,028	*d*5,555	27.16	4.57	5,280	141.04	17,065	*d*6,140	30.94	8.79
Route 5.....	7,808	*d*735.30	16,698	*d*6,004	46.76	9.19	7,926	343.26	14,638	*d*5,888	54.15	17.21	9,989	1,072.40	15,944	*d*7,610	62.65	24.78
Route 6.....	8,577	*d*2,111.30	20,340	*d*1,042	42.17	*d*7.82	7,746	*d*1,730.83	19,582	411	39.56	*d*9.88	9,646	*d*1,517.84	22,699	*d*2,610	42.50	*d*1.61
Route 7.....	2,781	*d*64.63	13,777	*d*5,157	20.19	5.16	2,985	416.55	12,048	*d*5,162	24.78	9.85	4,359	1,201.39	13,493	*d*5,651	32.31	15.81
Route 8.....	3,303	*d*326.57	24,199	*d*3,704	13.65	.64	2,961	*d*404.05	19,774	*d*4,756	14.98	1.26	4,166	110.39	24,190	*d*3,651	17.22	2.65
Total.....	$49,922	*d*$4,000.21	152,219	*d*25,902	32.80	2.53	$46,260	$*d*2,328.90	136,215	*d*23,497	33.96	3.54	$56,042	$586 88	155,770	*d*29,433	35 98	6.04

*d*Decrease.

Route 1	Highland & South Hadley Falls
Route 2	South Hadley Center & Elmwood, Chicopee & Elmwood
Route 3	Oakdale & North Pleasant St.
Route 4	Fairview and Westfield
Route 5	Springfield
Route 6	Chicopee Falls
Route 7	Northampton
Route 8	Amherst & Sunderland & Hampshire

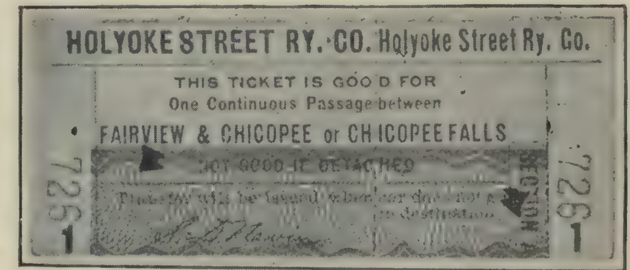
the fact that for the first sixteen days of February, 1918, at the old rates the receipts had been $2,290.90 or $143.18 a day less than for the same period of 1917. Therefore, the new rates must be credited with both the actual increase ($28.84) and the probable decrease ($143.18) or an average daily increase of $172.02. The earnings for the first six months of 1917 and 1918 are presented in Tables I and II.

It will be seen that for January, before the zone fare was installed, there was a drop in revenue of $4,000.21. Partial zone operation cut the February loss to $2,328.90. In March there was an increase of $586.88. In April the closing of the Westinghouse works at Chicopee Falls cut the increase to $168.55 as the Chicopee Falls line fell back $1,638.48. In fact, if the Chicopee Falls line had but held its own the increases would have been as follows:

	Theoretical	Actual
March	$2,104.72	$586.87
April	1,807.03	168.55
May	5,538.10	4,111.88
June	2,506.84	1,756.21

The drop in Springfield riding, shown for June, is doubtless due to the heavy increase in fare hereinafter noted.

That careful watch has been given to the car mileage is indicated by the fact that the car-miles were reduced on all lines but Oakdale and North Pleasant Streets. In some cases short-haul service has been added while decreasing the mileage as a whole. With approximately a 15 per cent reduction in the car mileage and the loss of between 5000 and 6000 men in the communities served, the gross earnings of the company, it is estimated, will be about 2 per cent more than they were for the year 1917. If the rates asked for by the company had been allowed by the Public Service Commission, it would have increased the revenue approximately $40,000.


HOLYOKE STREET RY. CO. Holyoke Street Ry. Co.
THIS TICKET IS GOOD FOR
One Continuous Passage between
FAIRVIEW & CHICOPEE or CHICOPEE FALLS
NOT GOOD IF DETACHED

TWO-ZONE TICKET USED IN HOLYOKE

In regard to the results of the adoption of the zone system for increasing revenue, it may safely be said that if the men who have left for the war, approximately 6000, had remained in the community, assuming that

TABLE II—SHOWING PASSENGER REVENUE, CAR-MILES AND EARNINGS PER CAR-MILE, HOLYOKE STREET RAILWAY FOR SECOND THREE MONTHS OF 1918

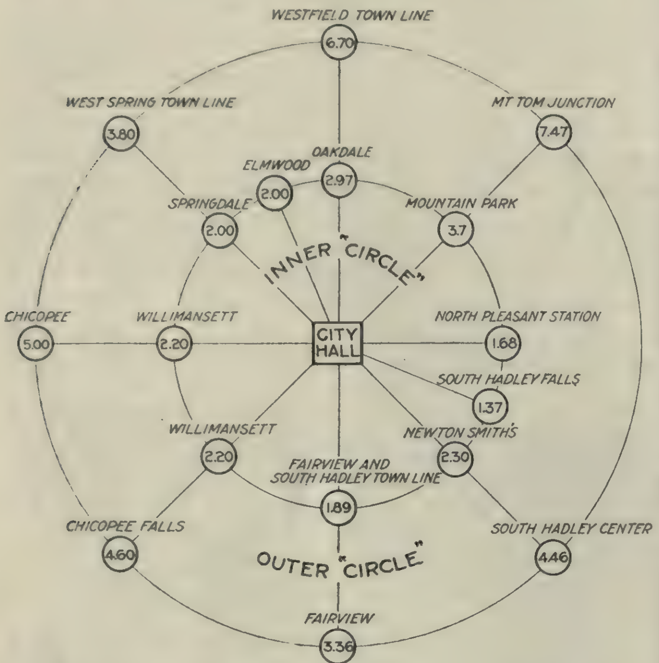
	April						May						June					
Lines	Passenger Revenue in 1918	Increase Over 1917	Car-Miles in 1918	Increase Over 1917	Earnings per Car-Mile, Cents	Increase Over 1917 Cents	Passenger Revenue in 1918	Increase Over 1917	Car-Miles in 1918	Increase Over 1917	Earnings per Car-Mile, Cents	Increase Over 1917	Passenger Revenue in 1918	Increase Over 1917	Car-Miles, 1918	Increase Over 1917	Earnings Per Car-Miles, Cents	Increase Over 1917, Cents
Route 1........	$6,269	*d*$902.23	18,894	*d*1,375	33.18	*d*2.20	$8,597	$358.00	23,154	*d*1,840	32.78	*d*$0.19	$10,529	*d*$111.80	28,199	*d*2,665	37.41	2.98
Route 2........	13,111	500.93	34,573	*d*2,001	37.92	3.44	13,775	1.058.24	36,069	*d*1,370	38.19	4.23	13,619	650.04	35,511	*d*869	38.43	2.73
Route 3........	2,107	473.87	7,960	310	26.47	5.12	2,192	521.40	8,294	377	26.42	5.31	2,189	416.99	8.296	597	26.39	3.37
Route 4........	5,336	53.57	17,262	*d*5,706	30.91	7.91	6,155	755.46	18,485	*d*5,889	33.24	11.09	7,173	541.68	19,162	*d*6,356	37.44	11.46
Route 5........	9,650	920.97	16,866	*d*5,792	57.21	19.16	9,773	746.56	18,156	*d*5,364	53.82	15.45	10,390	*d*493.13	17,753	4,982	58.50	10.62
Route 6........	8,755	*d*1,638.48	22,398	*d*1,737	39.09	*d*3.97	9,327	*d*1,426.23	22,320	*d*3,215	41.78	*d*.33	9,404	*d*750.63	19,621	*d*5,515	47.94	7.76
Route 7........	4,132	701.03	13,676	*d*5,013	30.21	11.86	5,992	1,673.14	15,121	*d*4,870	39.63	18.03	7,496	1,274.16	15,035	*d*5,375	49.75	19.25
Route 8........	3,938	58.89	23,869	*d*2,628	16.50	1.86	4,053	425.30	23,865	*d*3,702	16.98	3.82	3,917	228.90	21,877	*d*6,240	17.89	4.76
Total........	$53,302	$168.55	155.498	*d*23,942	34.27	$4.66	$59,867	$4,111.87	165,464	25,873	36.18	$7.04	$64,720	$1,756.21	165.454	*d*31,435	39.18	7.18

d Decrease. See key to routes at bottom of Table I.

each one of these men spent 5 cents per day for transportation, the increase would have been $300 per day or a total increase of approximately $110,000, which approximates very closely the figure estimated from the installation of zone system.

It is obvious, therefore, that in order to obtain an increase of revenue sufficient to offset the increase in cost of labor and material, it will be necessary either to increase the rate per zone or decrease the length of the zone sufficiently to make up for the loss, due to the departure of this number of men for the war.

Whatever plan for securing more revenue is approved by the commission, the railway intends to retain the 5-cent base fare as there is ample scope for cutting down the 5-cent ride and still offer no temptation to walk. For example, free transfer riding across the inner zone, constituting a diameter of 4 miles, might be eliminated, the new fare being 5 cents plus a transfer charge.



NEW HOLYOKE ZONE SYSTEM, WITH DISTANCES TO CITY HALL

Modifications of the Holyoke-Springfield service conducted jointly with the Springfield Street Railway are also in hand. On this line the old fare of 10 cents with transfers anywhere has been superseded by four 5-cent fares with transfers within the arrival zone only. It is proposed to inaugurate a "limited service," the running time between the two cities to be reduced from fifty minutes as at present to thirty-five minutes. Only eight stops will be made between the two cities and the cars will run until the crews meet, thus obviating the delay at the Holyoke-West Sheffield line. Limited cars will be run every forty minutes in the morning and every twenty minutes in the afternoon. Ultimately it is intended to make the run in a half hour, when the congestion which now exists in Springfield can be relieved.

Local service will be furnished to the West Springfield town line by each company, and the schedules are made so that under normal condition the cars will meet at the line, but it is not intended that the cars shall wait beyond their leaving time at this point but will change crews at other points en route. This change will eliminate delays due to layovers.

The new service means through cars every thirty or twenty minutes instead of every fifteen minutes in favor of more service for the outlying part of Holyoke and the territory contiguous thereto.

Fare Collection and Transfer Practice

All tickets good for riding in two zones are partially perforated to permit a stub, bearing the same identification numbers, to be torn therefrom. When the passenger presents the complete ticket the stub, which is really a token to permit riding into a second zone, is returned to the passenger. This stub is collected by the conductor in the second zone, but the only registration made by him is when he makes the first collection. This is in accord with the company's practice to register nothing worth less than 5 cents. Hence it eliminates the possibility of registering a lower fare for a higher one. At the end of each round trip the conductor turns in both tickets and stubs to the receivers, who match them so far as possible. A few stubs may be missing in cases where the passenger left the car just before the second collection, but this is not important. Both the body and stub must be perforated by the conductor as a cancellation.

One transfer is given on presentation of a stub. In case of a three-zone ride, the conductor takes up a complete ticket and issues a duplex transfer. One-half of this duplex is collected by the conductor on the second car in the first zone and the other half in the following zone. Transfers are not registered. The number of complete tickets turned in should equal the number of duplex transfers issued, thus securing a check on the mishandling of duplex transfers.

Instead of slowing up fare collection, the zone system appears to accelerate it, since half of the riders pay 5 cents as before while most of the remainder use tickets. It is possible that scrip tickets will be issued later to permit a ride in the first zone with two tickets and thereafter with one ticket for each zone. This will limit the present variety of tickets to the school and adult classifications only.

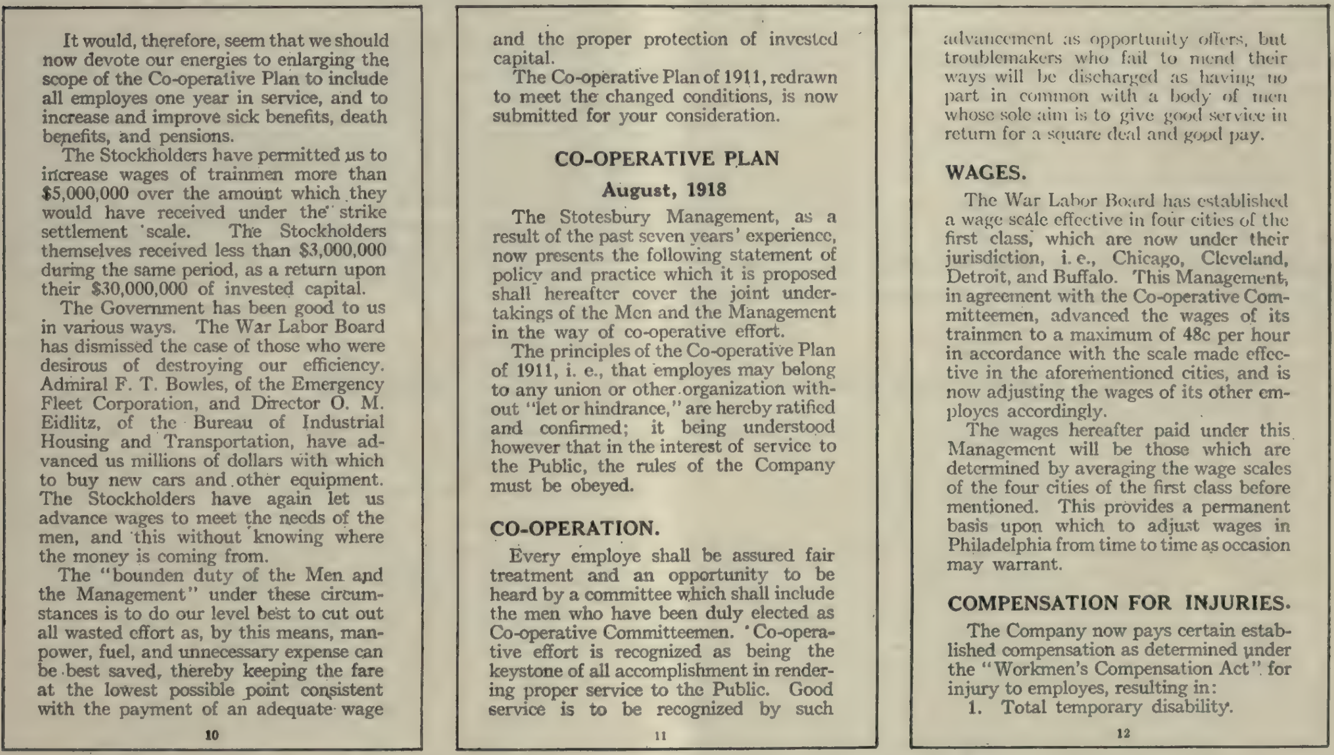
Massachusetts Roads Save Coal

MASSACHUSETTS electric railways will save about 200,000 tons of coal this year by improved methods of operation, according to reports in the hands of James J. Storrow, Federal Fuel Administrator for New England. Ninety per cent of the street railway mileage in the State is represented in this campaign, which is being handled by a committee composed of H. Bertram Potter, assistant to the president Boston Elevated Railway; A. E. Potter, general manager Rhode Island Company; C. D. Emmons, general manager Boston & Worcester Street Railway; David A. Belden, president Massachusetts Northeastern Street Railway; and Charles C. Peirce, head of the railway department General Electric Company, Boston office. The fuel saving is accomplished through improved methods of using power, elimination of stops, reduction of traffic loads on "heatless" Mondays and holidays, and power-plant economy.

Philadelphia Co-operative Plan Extended

Success of the Plan for Producing Cordial Relations Between Labor and Capital Is Demonstrated by Eight Years of Experience—Wages Now Raised to Equal the Highest Established by War Labor Board—Several Changes Made in Original Plan

WHEN the co-operative plan of administration was begun on the Philadelphia Rapid Transit System in 1910 by the Stotesbury-Mitten management, it was recognized as a radical departure in electric railway practice. To give to the employees through regularly elected representatives an equal voice with the company in nearly every question concerned with operation in which the comfort and welfare of the employees was concerned was unprecedented. Practically the only matters on which the company retained entire control were those of wages, which were governed by the well-known 22-per cent rule, and discipline. Hence it is not surprising that the plan attracted the attention of many authorities on the subject of industrial economy.



It would, therefore, seem that we should now devote our energies to enlarging the scope of the Co-operative Plan to include all employes one year in service, and to increase and improve sick benefits, death benefits, and pensions.

The Stockholders have permitted us to increase wages of trainmen more than $5,000,000 over the amount which they would have received under the strike settlement scale. The Stockholders themselves received less than $3,000,000 during the same period, as a return upon their $30,000,000 of invested capital.

The Government has been good to us in various ways. The War Labor Board has dismissed the case of those who were desirous of destroying our efficiency. Admiral F. T. Bowles, of the Emergency Fleet Corporation, and Director O. M. Eidlitz, of the Bureau of Industrial Housing and Transportation, have advanced us millions of dollars with which to buy new cars and other equipment. The Stockholders have again let us advance wages to meet the needs of the men, and this without knowing where the money is coming from.

The "bounden duty of the Men and the Management" under these circumstances is to do our level best to cut out all wasted effort as, by this means, manpower, fuel, and unnecessary expense can be best saved, thereby keeping the fare at the lowest possible point consistent with the payment of an adequate wage

10

and the proper protection of invested capital.

The Co-operative Plan of 1911, redrawn to meet the changed conditions, is now submitted for your consideration.

CO-OPERATIVE PLAN

August, 1918

The Stotesbury Management, as a result of the past seven years' experience, now presents the following statement of policy and practice which it is proposed shall hereafter cover the joint undertakings of the Men and the Management in the way of co-operative effort.

The principles of the Co-operative Plan of 1911, i. e., that employes may belong to any union or other organization without "let or hindrance," are hereby ratified and confirmed; it being understood however that in the interest of service to the Public, the rules of the Company must be obeyed.

CO-OPERATION.

Every employe shall be assured fair treatment and an opportunity to be heard by a committee which shall include the men who have been duly elected as Co-operative Committeemen. Co-operative effort is recognized as being the keystone of all accomplishment in rendering proper service to the Public. Good service is to be recognized by such

11

advancement as opportunity offers, but troublemakers who fail to mend their ways will be discharged as having no part in common with a body of men whose sole aim is to give good service in return for a square deal and good pay.

WAGES.

The War Labor Board has established a wage scale effective in four cities of the first class, which are now under their jurisdiction, i. e., Chicago, Cleveland, Detroit, and Buffalo. This Management, in agreement with the Co-operative Committeemen, advanced the wages of its trainmen to a maximum of 48c per hour in accordance with the scale made effective in the aforementioned cities, and is now adjusting the wages of its other employes accordingly.

The wages hereafter paid under this Management will be those which are determined by averaging the wage scales of the four cities of the first class before mentioned. This provides a permanent basis upon which to adjust wages in Philadelphia from time to time as occasion may warrant.

COMPENSATION FOR INJURIES.

The Company now pays certain established compensation as determined under the "Workmen's Compensation Act" for injury to employes, resulting in:

1. Total temporary disability.

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THREE PAGES FROM ISSUE OF CO-OPERATIVE BULLETIN FOR AUGUST, 1918, DESCRIBING IN PART NEW CO-OPERATIVE PLAN

Among those who have contributed their views upon the workings of the co-operative plan at length to the columns of this paper are Dr. Charles W. Eliot, president emeritus of Harvard, who described it as "remarkably successful" in an article on page 674 of the issue of this paper for Oct. 10, 1914, and Dr. Thomas Conway, Jr., of the Wharton School of Finance and Commerce, University of Pennsylvania, who reviewed the experience with the plan from 1910 to 1916 in an extended article which appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 4, 1916. Probably the most significant fact brought out by Professor Conway was that while the resignations of employees from the service during the five years ended May 31, 1910, had averaged 3096 annually and the discharges 1628 a year, these figures had been reduced to an average of 225 and 129 respectively during the two years ended May 31, 1916, the last complete fiscal year of the company at the time the article was written. Equally notable was the record on the system as regards labor difficulties. From a period of almost continual strikes before the inauguration of the system, this method of settling disputes has practically disappeared from Philadelphia. There have been during the past eight years, it is true, two or three attempts of this kind to create trouble by a few dissatisfied employees, but they were completely abortive, as the great majority of men preferred to remain loyal to the company.

WHAT THE CO-OPERATIVE PLAN HAS DONE

The practical results of the plan have been beneficial to employees, company and public. The maximum wage of conductors and motormen was 23 cents an hour in 1911 when the company agreed, under the co-operative plan, to devote 22 per cent of its gross receipts to the payment of wages to its transportation employees. Under this agreement the wage had risen on July 15, 1918, to 43 cents per hour. In addition, a sick benefit fund of $1 a day, a pension of $20 a month to superannuated employees, and death benefit aggregating $650, payable to dependents, had been inaugurated, available for all employees who had been two years in the service and paid 25 cents per month dues to the benevolent association.

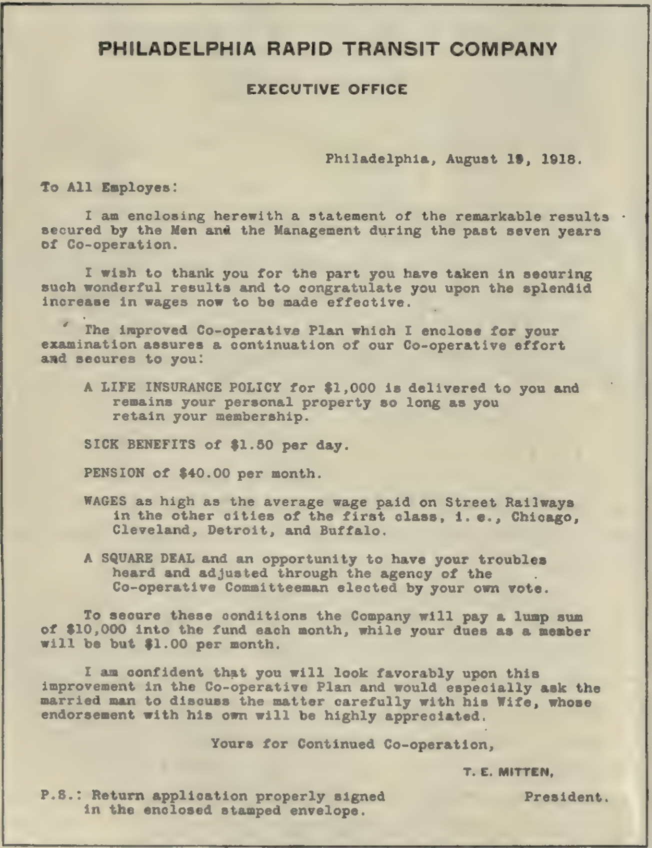
The benefits to the public and company were equally marked. So far as the latter is concerned, at the close of 1910, the company was practically bankrupt in cash, and the earnings in 1909 and 1910 had not been sufficient to meet the operating expenses, rentals and interest by more than $1,500,000. While the capital stock was $30,000,000 fully paid in, the fixed charges amounted to 46 per cent of the gross receipts. Now, without any increase in the capital stock, the fixed charges have been reduced to 32 per cent of the gross receipts, and dividends have been paid on the stock as follows: 1916, 2 per cent; in 1917, 5 per cent; in 1918, at the rate of 5 per cent per annum. The physical condition of the property has been greatly improved, and the last report of the company showed a surplus of more than $5,000,000 in the balance sheet.

The public has profited not only by the improved service and equipment but by reduced accidents and a reduced fare, the average fare during the year ended June 30, 1910, being 4.15 cents as compared with an average fare of 3.96 cents per passenger during the year ended June 30, 1918.

WAR-TIME CONDITIONS SUGGEST CHANGES

Changes have been required in the co-operative plan by war-time conditions, but they are changes in detail and not in principle. The labor situation in Philadelphia has been greatly affected by the war as the city has enormously expanded its manufacturing facilities through extensions to its many existing large industrial enterprises and the addition of others, particularly in the ship building line. All of these have made heavy drains on the labor supply, and it began to be difficult to recruit the right kind of men for the railway, even with the high wages then paid. This led to the revision of the co-operative plan, notably in the wages paid, announced early last month by President Mitten and accepted for the employees by the co-operative committee. In his talk outlining these changes as reported on page 301 of the issue of this paper for Aug. 17, President Mitten described the importance of the war transportation done by the Philadelphia Rapid Transit Company and the necessity of all employees giving their best service. He also referred to the past labor situation on the property, saying that there still existed the Amalgamated Association, a former branch of the Amalgamated Association which seceded from the national body some years ago under the leadership of a man named Pratt, and a local organization known as the Keystone Union. President Mitten referred to the question of wearing buttons denoting the union affiliation in the following words:

> Now as to the button question, we remember the condition of things in 1911 when some of us were wearing the Keystone button, the Amalgamated button and the button of the Prattites. Fights on duty were an ordinary occurrence. Accidents by collision of cars increased in number; in fact, the men were so busy trying to convert each other that they had little time left to devote to the performance of their duty.
>
> We still have the Keystone, the Amalgamated and the Prattites, and, therefore, can not consider going back to the old condition of "bedlam let loose" by allowing organization buttons to be worn while on duty—so we will have none of that.



PHILADELPHIA RAPID TRANSIT COMPANY

EXECUTIVE OFFICE

Philadelphia, August 19, 1918.

To All Employes:

I am enclosing herewith a statement of the remarkable results secured by the Men and the Management during the past seven years of Co-operation.

I wish to thank you for the part you have taken in securing such wonderful results and to congratulate you upon the splendid increase in wages now to be made effective.

The improved Co-operative Plan which I enclose for your examination assures a continuation of our Co-operative effort and secures to you:

A LIFE INSURANCE POLICY for $1,000 is delivered to you and remains your personal property so long as you retain your membership.

SICK BENEFITS of $1.50 per day.

PENSION of $40.00 per month.

WAGES as high as the average wage paid on Street Railways in the other cities of the first class, i. e., Chicago, Cleveland, Detroit, and Buffalo.

A SQUARE DEAL and an opportunity to have your troubles heard and adjusted through the agency of the Co-operative Committeeman elected by your own vote.

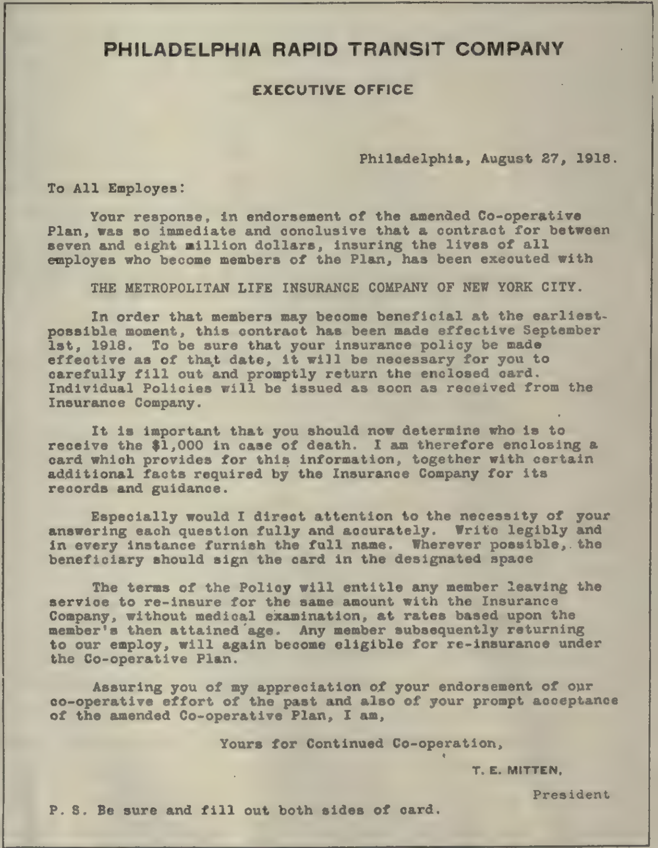
To secure these conditions the Company will pay a lump sum of $10,000 into the fund each month, while your dues as a member will be but $1.00 per month.

I am confident that you will look favorably upon this improvement in the Co-operative Plan and would especially ask the married man to discuss the matter carefully with his Wife, whose endorsement with his own will be highly appreciated.

Yours for Continued Co-operation,

T. E. MITTEN,
President.

P.S.: Return application properly signed in the enclosed stamped envelope.



PHILADELPHIA RAPID TRANSIT COMPANY

EXECUTIVE OFFICE

Philadelphia, August 27, 1918.

To All Employes:

Your response, in endorsement of the amended Co-operative Plan, was so immediate and conclusive that a contract for between seven and eight million dollars, insuring the lives of all employes who become members of the Plan, has been executed with

THE METROPOLITAN LIFE INSURANCE COMPANY OF NEW YORK CITY.

In order that members may become beneficial at the earliest possible moment, this contract has been made effective September 1st, 1918. To be sure that your insurance policy be made effective as of that date, it will be necessary for you to carefully fill out and promptly return the enclosed card. Individual Policies will be issued as soon as received from the Insurance Company.

It is important that you should now determine who is to receive the $1,000 in case of death. I am therefore enclosing a card which provides for this information, together with certain additional facts required by the Insurance Company for its records and guidance.

Especially would I direct attention to the necessity of your answering each question fully and accurately. Write legibly and in every instance furnish the full name. Wherever possible, the beneficiary should sign the card in the designated space

The terms of the Policy will entitle any member leaving the service to re-insure for the same amount with the Insurance Company, without medical examination, at rates based upon the member's then attained age. Any member subsequently returning to our employ, will again become eligible for re-insurance under the Co-operative Plan.

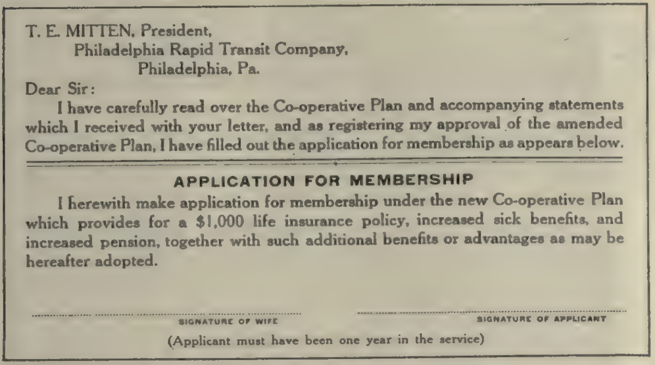
Assuring you of my appreciation of your endorsement of our co-operative effort of the past and also of your prompt acceptance of the amended Co-operative Plan, I am,

Yours for Continued Co-operation,

T. E. MITTEN,
President

P. S. Be sure and fill out both sides of card.

AT LEFT, FIRST LETTER ON IMPROVED CO-OPERATIVE PLAN SENT TO EVERY EMPLOYEE. AT RIGHT, SECOND LETTER ON CO-OPERATIVE PLAN



T. E. MITTEN, President,
Philadelphia Rapid Transit Company,
Philadelphia, Pa.

Dear Sir:

I have carefully read over the Co-operative Plan and accompanying statements which I received with your letter, and as registering my approval of the amended Co-operative Plan, I have filled out the application for membership as appears below.

APPLICATION FOR MEMBERSHIP

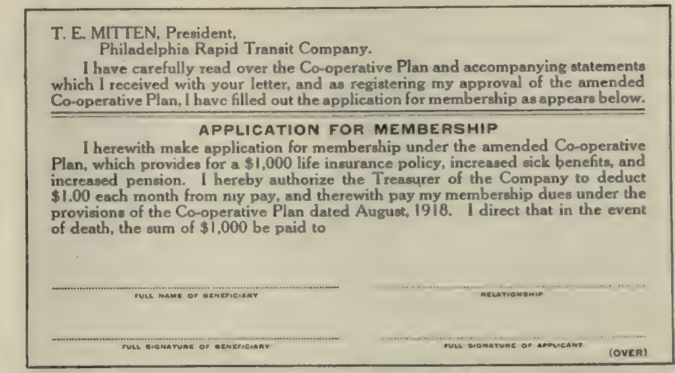
I herewith make application for membership under the new Co-operative Plan which provides for a $1,000 life insurance policy, increased sick benefits, and increased pension, together with such additional benefits or advantages as may be hereafter adopted.

SIGNATURE OF WIFE

SIGNATURE OF APPLICANT

(Applicant must have been one year in the service)

RETURN CARD SENT WITH LETTER OF AUG. 19



T. E. MITTEN, President,
Philadelphia Rapid Transit Company.

I have carefully read over the Co-operative Plan and accompanying statements which I received with your letter, and as registering my approval of the amended Co-operative Plan, I have filled out the application for membership as appears below.

APPLICATION FOR MEMBERSHIP

I herewith make application for membership under the amended Co-operative Plan, which provides for a $1,000 life insurance policy, increased sick benefits, and increased pension. I hereby authorize the Treasurer of the Company to deduct $1.00 each month from my pay, and therewith pay my membership dues under the provisions of the Co-operative Plan dated August, 1918. I direct that in the event of death, the sum of $1,000 be paid to

FULL NAME OF BENEFICIARY

RELATIONSHIP

FULL SIGNATURE OF BENEFICIARY

FULL SIGNATURE OF APPLICANT

(OVER)

RETURN CARD SENT WITH LETTER OF AUG. 27

The meat of the button question elsewhere is that it denotes the willingness of the company to permit men to belong to the union. Well, we do that in an unqualified way without there being any need of recourse to the button to prove it, and in order to reassure the War Labor Board in this regard I suggest that we now reaffirm the principles of the Co-operative Plan, as adopted by the Stotesbury management in 1911, namely, that employees of the company may join and belong to any union or other organization without interference of any kind, but in order that the service to the public and to the war workers be safe and satisfactory, the rules of the company must be obeyed.

How the Wage Rate Was Determined

The wage rate for the conductors and motormen for the surface lines in Philadelphia was determined by taking the highest rate recommended for surface cars by the War Labor Board in its recent decisions. In consequence conductors and motormen during the first three months of service receive 43 cents an hour, during the following nine months 46 cents an hour and thereafter 48 cents an hour. For all overtime of swing runs exceeding 14 hours, an addition in pay for the period of such excess time is allowed as follows: For the fifteenth hour, fifteen minutes; for the sixteenth hour, thirty minutes; for the seventeenth hour, forty-five minutes; for the eighteenth and each succeeding hour, one hour. Time and one-half is also paid for extra trips or tripper service. For motormen on the elevated system, an advance of 3 cents on these figures was agreed upon because this has been the excess which the elevated motormen have enjoyed.

As for wages in the future, the company has offered and the co-operative committee has agreed to accept a wage schedule made up by averaging the wage scales of the other cities of first class which had submitted their questions of wage schedules to the War Labor Board, *i.e.*, Chicago, Cleveland, Detroit and Buffalo. The new plan also extends this permanent basis to the wages of the men in the electrical, rolling stock and buildings, way and transportation departments for which, under the former 22 per cent agreement, there was no provision.

Other Beneficial Features of New Plan

Other beneficial features of the co-operative plan announced in connection with or shortly after the increase in wages was a life insurance policy for $1,000 for each employee, sick benefit of $1.50 a day, and a pension of $40 a month to incapacitated employees who have reached sixty-five years of age and have been continuously in the service for twenty-five years. The cost of these benefits is to be defrayed from a fund to which each employee who accepts the plan will contribute $1 a month and to which the company will contribute a lump sum of $10,000 a month. In making this offer the company says that it will be contingent upon the general acceptance of the plan by a large majority of the employees, and to determine whether they were in favor of it it sent two letters to each employee, one on Aug. 19 and one on Aug. 27. These letters are reproduced herewith. The first was accompanied by a card on which the employee could indicate whether the proposed amendments to the co-operative plan received his approval. The second card which was sent out with the letter of Aug. 27 authorized the treasurer of the company to deduct $1 each month from the pay of the employee as dues under the co-operative plan, gave the name of the beneficiary for the insurance policy and (on the back) contained statistical data in regard to the age, etc., of the employee.

The first page of the life insurance policy, which is issued by the Metropolitan Life Insurance Company, reads as follows:

> This is to certify that under and subject to the terms and conditions of Group Policy No. 138G ————————, an employee of the Philadelphia Rapid Transit Company is hereby insured for one thousand dollars.
>
> If death occur while said employee is in the employ of the Philadelphia Rapid Transit Company, the amount of insurance in force on said employee, in accordance with Group Policy as above, will be paid to ——————————, who has been named as beneficiary.
>
> The employee may change the beneficiary at any time in the manner set forth on the back hereof.
>
> *Privilege of Continuance.*—In the event of the termination of the employment for any reason whatsoever, the employee shall be entitled to have issued to him by the Metropolitan Life Insurance Company, without further evidence of insurability, and upon application made to the Metropolitan Life Insurance Company within thirty-one days after such termination, and upon the payment of the premium applicable to the class of risk to which he belongs and to the form and amount of the policy at his then attained age, a policy of life insurance in any one of the forms customarily issued by the Metropolitan Life Insurance Company, term insurance excepted, in an amount equal to the amount of his protection under the group insurance policy at the time of such termination.

The conditions printed on the back of the policy include, among other things, an agreement that if the person insured, before he is sixty years old should become permanently disabled by accidental injury or disease, further payments will not be required and the person injured will receive instead for each $1,000 of insurance, either sixty monthly installments of $18.00, or twenty annual installments of $67.98, or fifteen annual installments of $83.90, or ten annual installments of $116.18, or five annual installments of $214.00. If the insured dies during the period of total permanent disability, any installments remaining unpaid shall be payable as they become due to the beneficiary nominated by him. The acceptance of the plan thus far has been practically unanimous, although the men have until Sept. 15 to signify their consent.

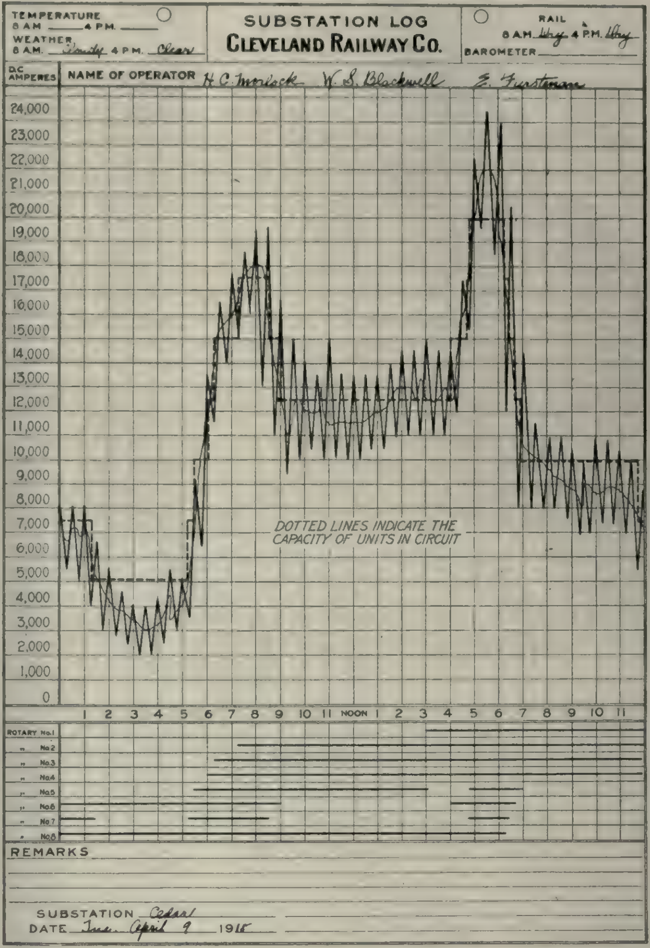
The co-operative plan of August, 1918, differs in a few other points from that of 1910, particularly in the fact that the earlier plan was restricted to the transportation employees. The present plan takes in all of the departments, all of which will now be represented on the co-operative committee.

Adjusting Substation Capacity to the Load Line

THE Cedar Avenue substation of the Cleveland (Ohio) Railway was described in the issue of the ELECTRIC RAILWAY JOURNAL for April 13, 1918, page 700. In the article the point was made that one of the fundamental principles in the design of the substation was to provide facilities for keeping the capacity of machines in operation closely adjusted to the load line.

A sample power chart for this substation is reproduced herewith. From the diagram it is evident that the combination of facilities and care in operation result in almost perfect co-ordination of load and capacity. The other illustration shows the energy chart for the same day, and also incidentally gives an idea of the record form used in the substations on this property.

At right, typical graphical log for Cedar Avenue substation, Cleveland Railway; below, sample record sheet of energy readings. Cedar Avenue substation, Cleveland Railway.



TEMPERATURE 8 AM ____ 4 P.M. ____

WEATHER 8 AM. Cloudy 4 P.M. Clear

SUBSTATION LOG
CLEVELAND RAILWAY CO.

RAIL 8 AM. Dry 4 P.M. Dry

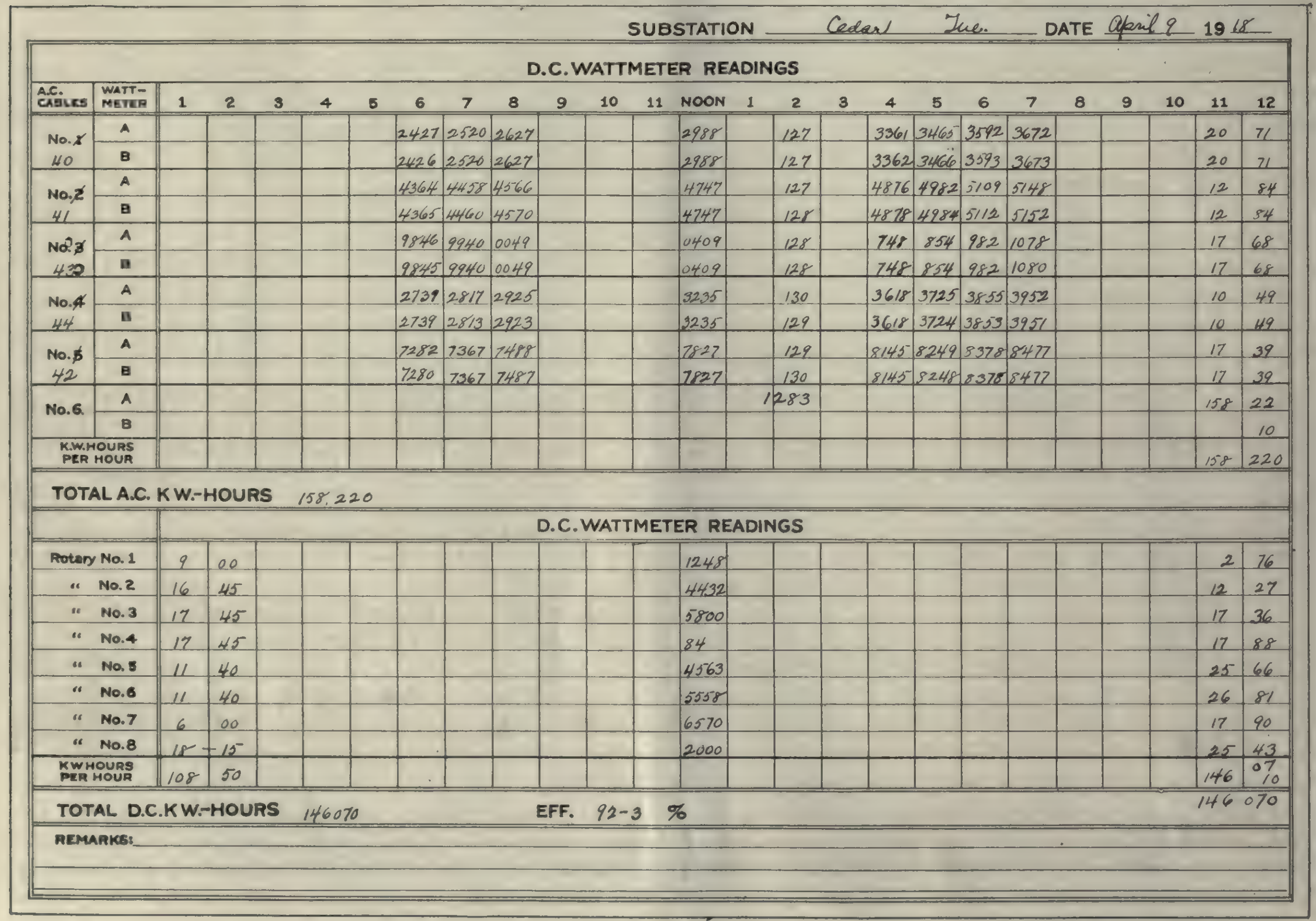
BAROMETER ____

NAME OF OPERATOR H. C. Morlock W. S. Blackwell E. Furstman

REMARKS

SUBSTATION Cedar

DATE Tue. April 9 1918



SUBSTATION Cedar Tue. DATE April 9 1918

D.C. WATTMETER READINGS

A.C. CABLES	WATT-METER	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	12
No. ~~1~~ 40	A						2427	2520	2627				2988		127		3361	3465	3592	3672				20	71
	B						2426	2520	2627				2988		127		3362	3466	3593	3673				20	71
No. ~~2~~ 41	A						4364	4458	4566				4747		127		4876	4982	5109	5148				12	84
	B						4365	4460	4570				4747		128		4878	4984	5112	5152				12	84
No. ~~3~~ 43	A						9846	9940	0049				0409		128		748	854	982	1078				17	68
	B						9845	9940	0049				0409		128		748	854	982	1080				17	68
No. ~~4~~ 44	A						2739	2817	2925				3235		130		3618	3725	3855	3952				10	49
	B						2739	2813	2923				3235		129		3618	3724	3853	3951				10	49
No. ~~5~~ 42	A						7282	7367	7488				7827		129		8145	8249	8378	8477				17	39
	B						7280	7367	7487				7827		130		8145	8248	8378	8477				17	39
No. 6	A														1283									158	22
	B																								10
K.W. HOURS PER HOUR																								158	220

TOTAL A.C. KW.-HOURS 158,220

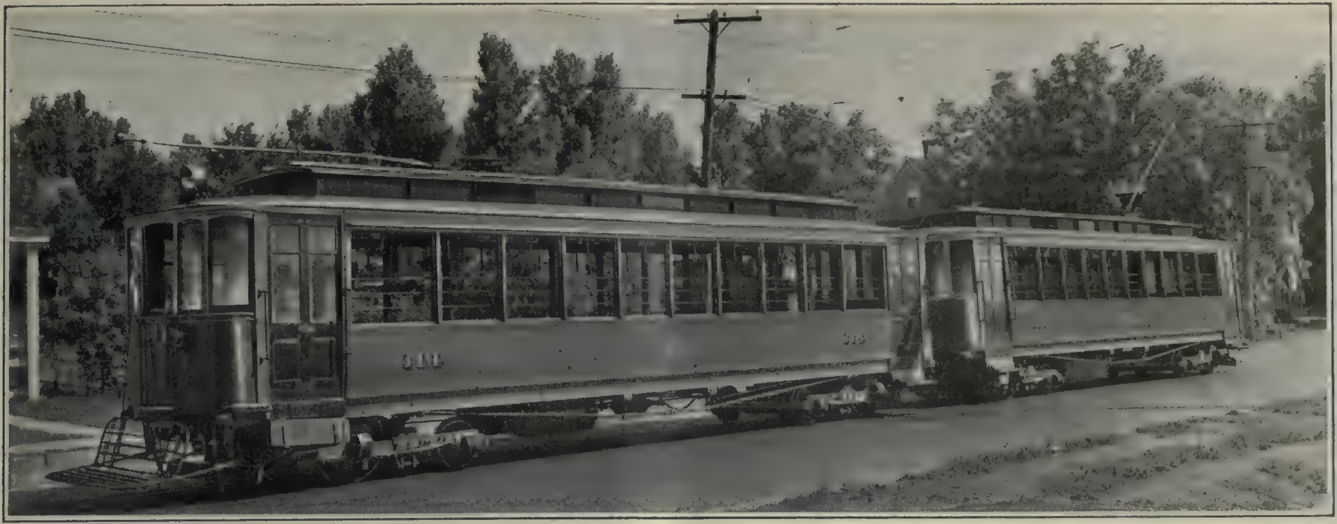
D.C. WATTMETER READINGS

	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	12
Rotary No. 1	9	00										1248											2	76
" No. 2	16	45										4432											12	27
" No. 3	17	45										5800											17	36
" No. 4	17	45										84											17	88
" No. 5	11	40										4563											25	66
" No. 6	11	40										5558											26	81
" No. 7	6	00										6570											17	90
" No. 8	18 –	15										2000											25	43
KW HOURS PER HOUR	108	50																					146	07 10

146 070

TOTAL D.C. KW.-HOURS 146070 EFF. 92-3 %

REMARKS:



TWO-CAR TRAIN USED AT DAVENPORT, REBUILT FROM TWO OPEN CARS

Two-Car Train Operation at Davenport

Tri-City Railways Rebuild and Buy Fifty-eight Cars to Handle the Large Increase in Number of Employees in Government Arsenal at Rock Island, Ill.

IN 1916, the United States government arsenal, located at Rock Island, Ill., employed about 3000 men. These employees lived in Davenport, Rock Island and suburbs and 40 per cent of them used the cars of the Tri-City Railways to and from work. This traffic was handled by nineteen special cars arriving at the arsenal at 8 a.m. and leaving again at 4.30 p.m.

In the fall of 1917 the work of increasing the facilities at the arsenal began and by Jan. 1, 1918, the number of employees had increased from 3000 to 9000. This made a serious transportation problem for the Tri-City Railways, as more than 60 per cent of these men have to be handled on the street cars.

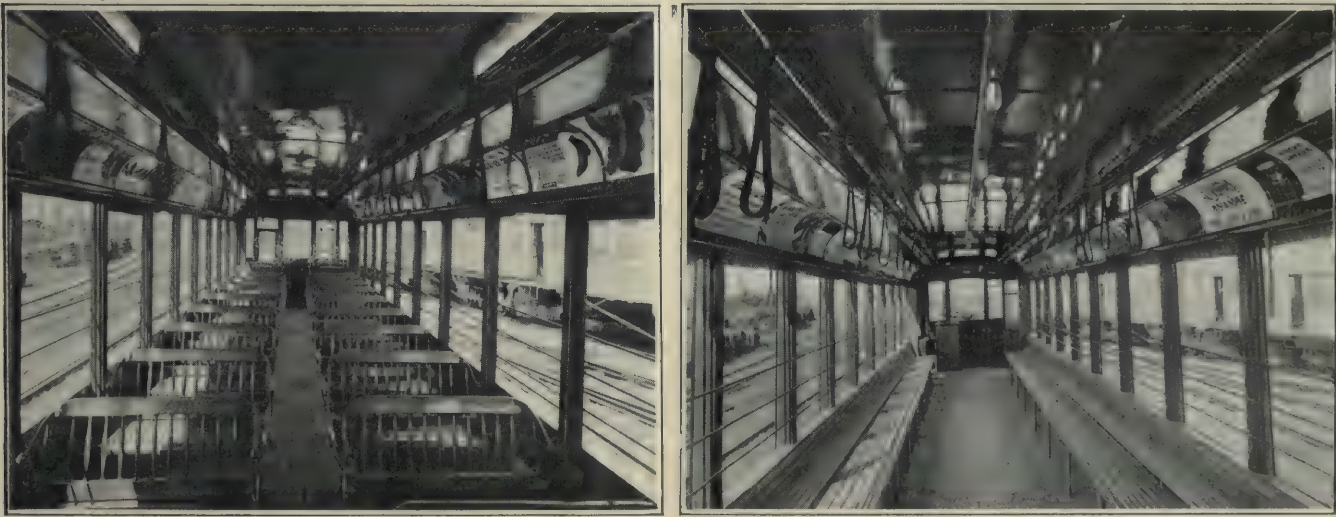
NEW TRACK COSTS $75,000

The first change which was made was the relaying of the track on the arsenal grounds. This change is shown in the map on page 464. The heavy dotted line indicates the new track construction from point *A* up to Main Avenue, through the heart of the arsenal layout and down to point *B* where it connects with the former track. This new trackage consists of 2.4 single-track miles of 60-lb. T-rail laid on crushed stone ballast. The No. 00 trolley wire is supported by Bates expanded steel poles with mast-arm construction. Double track is laid between points *C* and *D*.

The company installed 1500 ft. of new No. 0000 feeder cable from Rock Island, and 300 ft. of 750,000-circ.mil and 150 ft. of 500,000-circ.mil feeder in the downtown loop district of Davenport. A 400-kw. motor-generator set was transferred from the Rock Island plant to Moline and replaced by a 1000-kw. rotary converter.

All track was bonded by the oxy-acetylene head-weld process, which included the rebonding of track from point *B* to Rock Island. The cost of this new track construction amounted to approximately $75,000.

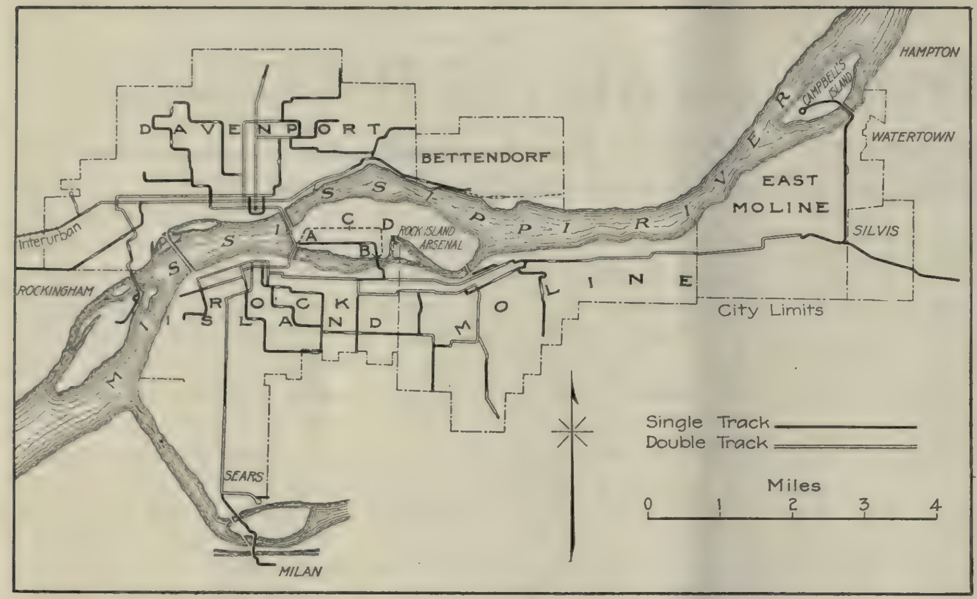
With the completion of the new track layout it was found essential to obtain additional car equipment. On



INTERIOR OF CARS USED IN TWO-CAR UNITS BEFORE AND AFTER INTERIOR REMODELING

Nov. 1, 1917, the arsenal traffic was handled by nineteen cars, six from Rock Island and thirteen from Davenport. These carried 1200 passengers, 400 from Rock Island and 800 from Davenport.

By June 1 the arsenal traffic had been so greatly augmented that thirteen cars now leave the arsenal at 4.30 a.m., seven going to Davenport and six to Rock Island, carrying away the night shift. At 7 a.m. forty-three cars arrive, fifteen from Rock Island and twenty-eight from Davenport. Between 7 and 8 a.m. fifteen-minute service is maintained across the arsenal grounds and from 8 until 5 p.m. thirty-minute service. At 4.30 p.m. eight cars leave the arsenal for Davenport, carrying the construction men who are not government employees, and, therefore, work only eight hours. At 5.15 seven cars, five to Davenport and two to Rock Island, carry out the office force of girls only. At 5.30 forty-two cars, fifteen to Rock Island and twenty-seven to Davenport, take out the day shift, the same cars bringing in the night shift from 5 to 5.15 p.m.



MAP OF TRACK LAYOUT OF TRI-CITY RAILWAY

In the evening the first car leaves the arsenal two minutes after the closing whistle blows and the others follow in rapid succession. It has been a problem to load the men fast enough. Double-end loading of single cars was first tried, but did not prove very satisfactory, and now queue loading has been voluntarily applied by the men. The load varies from eighty-five to 120 passengers per car, averaging 100 per car. This means that 63 per cent of the employees are now using the street cars.

To handle this traffic twelve new standard cars were purchased from the St. Louis and American Car Companies at a cost of $66,000. These were delivered the latter part of 1917. About February, 1918, thirty cars were purchased from the Chicago Surface Lines at a cost of $65,800. Twenty of these had formerly been open summer cars. Before delivery the running boards were removed and steel sheathing put on, so that when received at Davenport the cars appeared as shown in an accompanying view, and their equipment consisted of GE-57, 60-hp. motors, two K-11 controllers and Peckham maximum traction trucks with a 5-ft. wheelbase. Overall dimensions are: Length, 37 ft. 7 in., and width, 8 ft. Because of the shortage of trainmen and the crowded schedule necessary, it was decided to operate this equipment in two-car trains. The controllers were removed and one K-35-G-2 controller was placed on each car. Other changes consisted of removing the bulkheads and installing manually-operated folding doors, changing the cross seats to longitudinal slat seats and the lighting system from four 3-light clusters of 23-watt lamps to eight similar lamps in a single line down the center of the ceiling. There is now a compressor on each car, but both compressors are run on a single governor, and all connections for control, lighting, brakes, etc., are carried between cars by a tube fastened to the drawbar as illustrated. An interior of the cars before and after remodeling is also shown in an accompanying illustration. The cost of rebuilding these cars was $630 per train.

In addition to the rebuilding of the twenty Chicago surface cars, sixteen open summer cars from the Tri-City property are being made over into closed cars with longitudinal seats. This includes the same work as is being done to the Chicago cars, with the addition of removing the running-boards, building up the posts and putting on the body sheathing. Agasote is being used for this in place of steel.

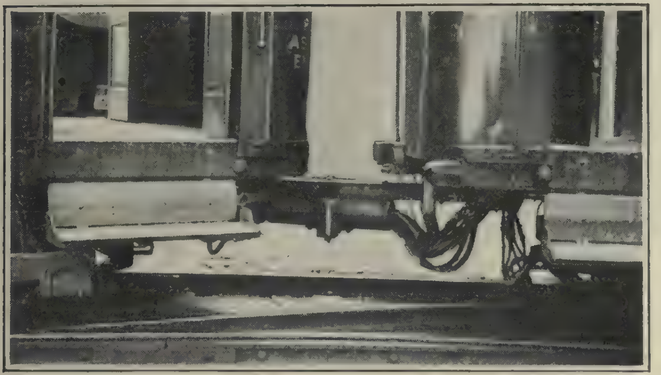
AVERAGE FARE ON ENTIRE PROPERTY IS 4.6 CENTS

Six classes of tickets are being used on the arsenal lines. This non-uniformity has been made necessary partly by government orders, partly because of interstate conditions, etc. The six classes are as follows: (1) First-class 10-cent bridge ticket, which entitles the holder to ride from any point in the three cities to the arsenal. This fare would ordinarily be 15 cents. (2) A special two-coupon ticket purchased only by the government at 5 cents for its employees and good between the arsenal and the loop districts. (3) A ticket good only for transportation across the government bridge and sold at ten for 25 cents. (4) Single-trip arsenal tickets sold for 5 cents to arsenal employees upon presentation of identification card properly signed and good for transportation between the arsenal and certain points in the Tri-Cities. (5) A $2 monthly ticket which entitles the holder to as many trips from any point in the three cities to the arsenal and return as there are weekdays in the month. Provision is made for thirty-one days, Sundays being punched out when the ticket is sold. (6) Cash fares.

ADDITIONAL POWER EQUIPMENT COSTS $650,000

Under former operating conditions, the arsenal took from 400 kw. to 500 kw. from the Tri-City Power & Light Company, while now 2500 kw. is being used. In addition to this there has been an increase of about 1000 kw. as a result of the heavy peak load caused by the arsenal rush-hour service and an increase in commercial consumption, due mainly to the added number of employees at the arsenal, of 25 per cent for the last six months of 1917, and of 25 per cent over that for the first four months of 1918.

To accommodate this large demand for energy, it has been necessary to increase the capacity of the plant 20,000 kw. A 20,000-kw. Westinghouse turbine was added, a new boiler room was built and three 1000-hp. Stirling-type boilers were installed, arranged for a 300 per cent rating. The total expense for this increase in plant capacity has been approximately $650,000.



CABLE CARRIER ATTACHED TO CAR COUPLER

WAGES AND LABOR

The high wages paid for both skilled and unskilled labor at the arsenal have had a disastrous effect upon the labor problem of the Tri-City Railways, and in spite of the four voluntary raises given by the company during the past year there is a considerable shortage of labor.

LETTER TO THE EDITORS

"Depreciation" Is an Impostor Term

NEW YORK, N. Y., Sept. 11, 1918.

To the Editors:

In an article in your issue of Aug. 24, entitled "Some Pitfalls in Regulating Depreciation," John Bauer, of Princeton University, asks:

> Are the reasonable present claims of the investors against the public any different, whatever further depreciation policy may be adopted? Why should investors get more or less whether the sinking fund, or the straight line method be employed? Are they not entitled to a fair return on a fair valuation? Should that not be the same by whatever way depreciation may hereafter be computed?

These words have an impartial sound, but careful reading of the article will disclose that Mr. Bauer holds no brief for public utilities. That he writes from the aloofness of university cloisters is no assurance that he has no interest in municipal ownership.

But what has depreciation to do with municipal ownership? The connection needs to be stated. The greater the amount of depreciation that can be imputed to a property, the less the base of return to the investor, the greater the difficulty in financing maturing obligations and the more likely the bondholders will be to scheme to have the property taken over. The greater the amount of depreciation, the greater will be the proportion of the utility's property which the municipality will claim already belongs to the public on the ground that some part of it is an invested depreciation fund, or assets owned equitably by the public to the extent of the credit to a depreciation reserve which is, or on some vague theoretical grounds ought to be, equal to "accrued depreciation."

Depreciation theories put public utilities on the bargain counter. They propose that the present generation of patrons shall pay more than the actual reasonable cost of their service through compulsory "depreciation allowances," in order that they may be acquired by the next generation at a substantially lower figure than would otherwise have to be paid. Or the depreciation doctrine more frequently asserts that part of the rates collected in the past were really "depreciation allowances" which have been paid out as dividends, and that consequently from a quarter to a half of the utility's property equitably belongs to the public, because it was bought and paid for by patrons of a past generation.

Mr. Bauer's article is a criticism of an opinion rendered by the Colorado Public Utilities Commission, on Oct. 8, 1917, in City of Lamar vs. Intermountain Railway, Light & Power Company, insofar as the commission there ruled that it would make no deduction "for depreciation" from original cost, which was taken as the rate base because original cost and cost of reproduction now would have been practically identical under normal conditions.

To begin with, he is a little unfair to the Colorado commission in questioning the sense of fixing the same basis of return to the investors whether the property is new, up to date and in every way suitable for its purpose, or whether it is old and worn and is extensively obsolete and inadequate. What the commission said is this:

> If in inventorying the property of a public utility, only such property as is in use and useful and in good service condition is included, the fair value of that property, for rate making purposes, may be arrived at without any determination of or deduction for accrued depreciation, provided the annual depreciation requirement is determined and set aside on the so-called sinking fund basis.

The one wise thing the commission did was to rule that no deduction should be made "for depreciation." It did not see its way clear to adopt any of the fanciful theories of valuation which involve confiscation of a substantial amount of property on the score of so-called "depreciation."

40 PER CENT DEPRECIATION FUND NOT NEEDED

But, in ruling that "the annual depreciation requirements will be determined and set aside on the sinking-fund basis," the commission erred. If its ruling shall be carried out to its conclusion, the company will eventually have a sinking fund which will approximate 40 per cent of the value of its property. What for? All the utility needs is provision for the maintenance of its property, which is an amount measured by its actual current requirements. By the new approved steam railroad contract, the government agrees to pay out for maintenance, repairs, renewals, retirement and depreciation such sums as may be necessary to keep the roads in as good condition as when received or to credit the roads with a sum equal to the "average annual expenditure" for that purpose. The theory of the contract is that the average annual expenditure will keep the roads in good condition forever. The government does not agree to accumulate a fund for depreciation or to reimburse the roads for any accruing depreciation, except that final "depreciation" which accrues coincidently with a retirement. The contract does not recognize any obligation to charge for progressive depreciation during the lifetime of railroad units, or any duty on the part of the roads to accumulate such a fund. That idea is right. The government perceives that it is right as soon as it ceases to be a regulator and becomes a manager.

This does not mean that the requirements of each year will always equal the average annual requirements of every public utility. Provision should be made for fluctuations, which will vary in degree among the different companies and will be most pronounced with the smaller companies. Each of the different alleged methods of computing depreciation and of determining amounts to be reserved against retirements, except the replacement method, will result in a greater reserve than necessary for its ostensible purpose. The reserve should be in the nature of a reservoir, into which will flow a uniform annual provision for the maintenance of the property, by renewals and replacements, and against which will be charged the book value of plant and equipment withdrawn from service. The amount of the reserve does not measure depreciation, nor is its function to make good any investment used up in service. It is for retirements, not for depreciation. It is not a partial return of capital, because it is a temporary quantity. There may even be a deficit in years of unusually costly replacements. Because of its transitory nature, the reserve presents to the utility no such hideous opportunity as shocks Mr. Bauer of making a return on more than the investment.

There is but one account in which a public utility can safely (in view of opinions of commissions in other jurisdictions) carry the earnings which it would withhold from distribution, and that is its "Profit and Loss" or "Surplus" account. If it is deemed necessary, for any particular purpose and as a matter of corporate policy, to segregate any of such surplus earnings, care should be taken to identify such segregated amount as a part of the undivided earnings belonging to the stockholders, so that it cannot be construed, on any theory, as a measure of impairment of the investment.

A balance to the credit of the reserve retirement account should not exceed what might be readily demonstrable as necessary for this current purpose. A company which does more than this displays a lamentable grasp of the problem of corporate financing and is in a fair way of having its reserve confiscated on the theory that it is public property. A utility officer who, after reading Mr. Bauer's article, would go ahead accumulating a so-called "depreciation reserve" through his operating expense account, would do so in utter disregard of the interests of the stockholders whom he represents and of the company with which he is but should not be identified.

What Mr. Bauer calls a "depreciation reserve" is actually a guise under which a substantial interest in the property of a utility may be acquired by the public. In his opinion, whether such a reserve is created on the straight line basis or sinking fund basis, if it be invested in plant and equipment (as he recommends that it should be) it must be deducted, in determining the investment upon which the utility is entitled to earn a return. He is quite frank about it, saying that, unless such deduction is made, "the investors will get a return also on the depreciation funds, contributed by consumers, through the rates paid for the service." He would be only a little more frank if he discarded the term "depreciation fund" and came out flat-footedly for a "partial piecemeal purchase fund."

Certainly, it goes without saying that no public utility cares to engage in the kind of partnership which Mr. Bauer's depreciation reserve involves, nor, for that matter, is there any public sentiment whatever favorable to the piecemeal purchase of public utilities by consumers through the return paid for the service. Such a plan, openly announced, would be rejected forthwith. It is only because of their apprehension that such a fate would befall it, if thus boldly announced, that its proponents camouflage it with the jargon of so-called "theoretical depreciation."

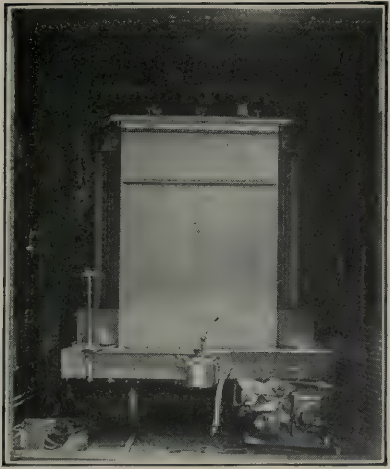
"DEPRECIATION" IS A POOR TERM

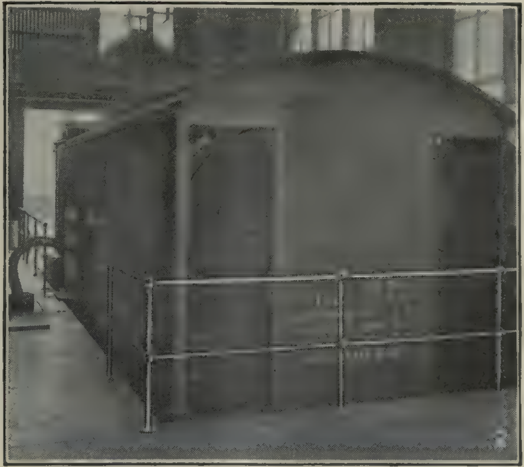
The word "depreciation" is too hazy to use in the terminology of a public utility. Without listing the dozen or more meanings which have been ascribed to it by more or less authoritative bodies, it is interesting to note that when the Interstate Commerce Commission tried recently to explain what Congress meant by "depreciation," in the railroad valuation act, it gave the word two different and inconsistent meanings on the same page of its opinion (Texas Midland case, p. 49) viz: "exhaustion of capacity for service," which is something physical, and "decline in value," which is something social and not physical at all.

"Depreciation" is a distorted and meaningless word. It is an impostor term. To the demagogue, it means anything he may wish it to mean, or he may use it as if it meant something when he has no idea of what he means. To one who seeks underlying principles of economics and sound finance, it means nothing at all. It should be discarded altogether.

There should be substituted for it an accounting title which will describe the intent and purpose of an account designed to carry, temporarily, the amounts provided for the maintenance of the property by renewals and replacements. Then, as stated, the provision for this purpose should not, by being excessive, furnish a basis for an attack by professional depreciationists seeking to impair the investment in plant and property devoted to the public service. LOUIS L. G. BENEDICT.

The Standard Oil Company has issued to its foremen some practical hints for the prevention of accidents, which have been reprinted by the National Safety Council. They are these: (1) Be fair. (2) Make few promises and keep them. (3) Don't waste anger—use it. (4) Always hear the other side. (5) Don't hold spite, forgive. (6) Never show discouragement. (7) Notice good work as well as bad. (8) Watch for special ability. (9) Take your full share of blame. (10) Prevent accidents.





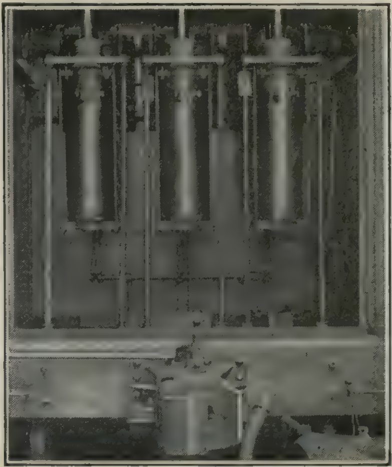


FIG. 1—TRANSFORMER END AND HIGH-TENSION CONNECTIONS. FIG. 2—PORTABLE SUBSTATION IN OPERATION AT HILLSIDE SUBSTATION. FIG. 3—VIEW OF OIL CIRCUIT BREAKER END

Largest Portable Substation Yet Produced

Long Island Railroad's 1500-Kw. Portable Substation Used in Parallel with Permanent Substations to Help with Excessive Loads or as Separate Substation

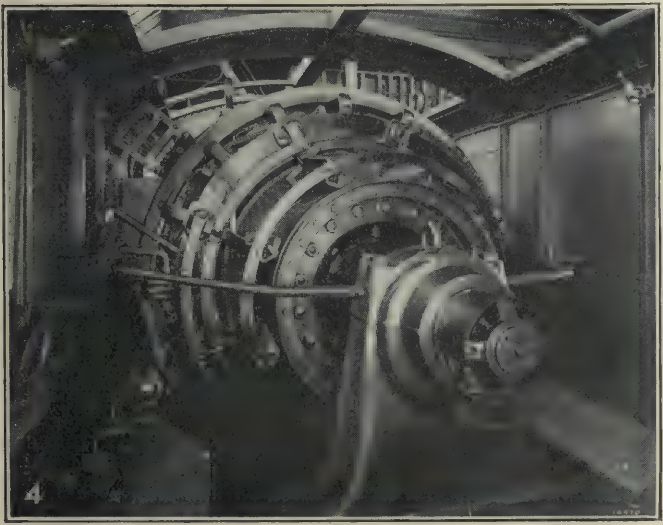
BY B. H. LYTLE
Power Department, Westinghouse Electric & Manufacturing Company

THE possession of a portable substation places a road in the enviable position of being able to render practically instant relief or assistance to other stations that may be temporarily put out of commission or called upon to carry a load beyond their capacity. Direct current can be obtained from the portable substation on very short notice, as its production involves only transferring the substation to the desired location, and connecting to the high-tension line.

The Long Island Railroad has the largest portable substation yet produced. It has a normal capacity of 1500 kw. and contains a 1500-kw., 650-volt direct-current, 25-cycle Westinghouse rotary converter; three 500-kva. combination oil-insulated self-cooled and air-blast single-phase, 25-cycle outdoor transformers; complete switching equipment and auxiliary apparatus. The transmission voltage is 11,000, but the substation is arranged for operation on 33,000 volts, which may be used in the future. The car is constructed for both indoor and outdoor service.

Many manufacturing difficulties were encountered due to restriction of the over-all dimensions of the car. The length was limited to 38 ft. since the permanent substations are equipped inside with railroad sidings of this length on which the portable substation is located when operating in multiple with the permanent units. The width and height were restricted by traffic regulations, the maximum width permissible being 10 ft. With these limitations the greatest possible capacity was required; and in addition, the apparatus had to be so distributed as to leave plenty of space inside the car for proper attention to the converter and switching apparatus.

The transformers presented the most difficult problem. In order to bring the height and floor space within the required limits, forced air cooling had to be provided to supplement the self-cooling properties of these units. A small motor-driven fan, housed inside the main cab which also contains the converter and switchboard, supplies the air. This is discharged into a duct surrounding the lower part of the transformers, where baffle plates and guides so direct it that an even distri-



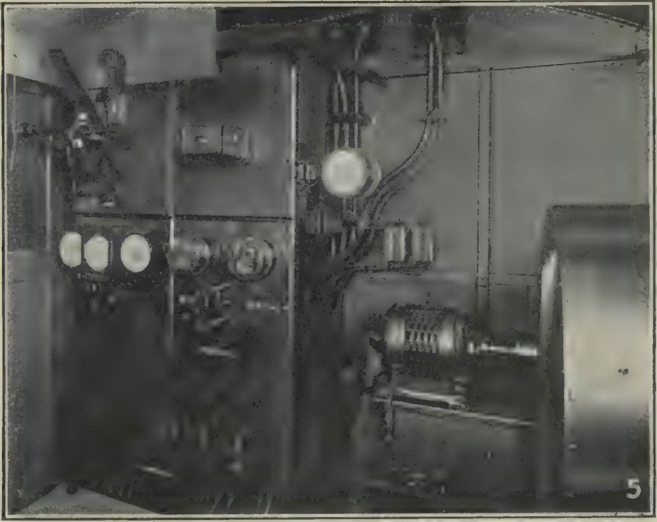
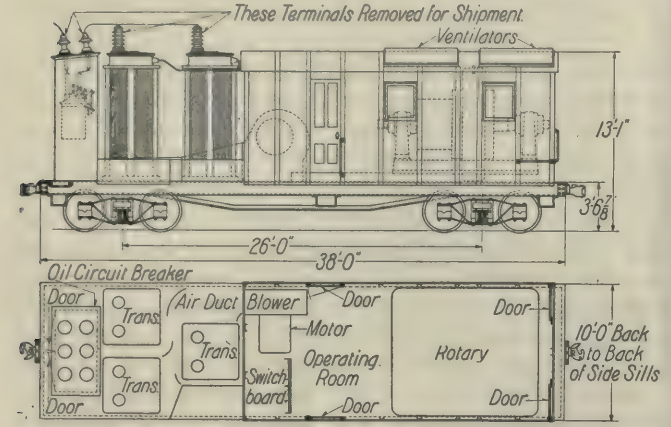


FIG. 4—VIEW OF CONVERTER SECTION. FIG. 5—CONVERTER SWITCHBOARD AND MOTOR-DRIVEN FAN

bution is obtained on all sides. The air is forced from the duct up between the corrugations, and although the duct is only 18 in. high at its lowest point, the air is carried to the top of the transformers. The normal radiation of the cases is thereby increased more than 25 per cent permitting a material reduction in the size of the tanks.

The converter is entirely standard in construction with the addition of a leveling device, the function of which is to keep the machine level in case the car is standing with its floor at an angle. Ventilation is provided by four trapdoors in the roof of the cab, each door being provided with a water-tight removable cover which is kept in place during outdoor operation. When the covers are removed, as they are for indoor service, a total opening of 75 sq.ft. is provided. Holes through the floor inside the converter bedplate provide ventilation in addition to the air which enters the doors and window.



GENERAL ARRANGEMENT OF APPARATUS IN PORTABLE SUBSTATION

ROOF OVER CONVERTER IS BUILT WITH REMOVABLE SECTION

To permit the converter to be placed in the car or removed from it, the roof of the cab over the machine consists of a removable section built upon a framework, so that it can be raised without injury. To indicate the closeness of the spacing, it may be noted that there was but ⅜-in. clearance on each side between the converter bedplate and the eaves of the car when the machine was being lowered into position.

The switching equipment practically follows the standard used for portable substations, except that instead of using Burke horn-gap high-tension switching, this car is provided with an oil circuit breaker, located in a separate housing at the end of the car opposite from the main cab. This arrangement permits of the high-tension current entering at one end of the substation and passing through the transformers, the final production of direct current by the converter being at the other end. The direct-current terminals are located at each side of the car in order more conveniently to make connections with the direct-current bus of the permanent station.

The apparatus is arranged so as to concentrate all available space near the center of the car to provide room for the operator; thus sufficient space is provided so that four or five men can be with the operator without interfering with his work.

CAR IS OF HEAVY AND RUGGED CONSTRUCTION

The car was built by the Railway & Industrial Engigeering Company and is of the most rugged construction. The frame is built with a solid box girder extending the entire length of the car. The girder is reduced to 12 in. over each truck, but at the center is 24 in. deep. The cross-bearers are so located that they relieve the ¼-in. steel floor of the support of the heavy equipment. Although the car is arranged so that jacks can be used at each corner to steady it during operation, it has been found that the method of supporting the equipment and the manner in which it is balanced give operation which is practically free from vibration without the use of the jacks.

The Long Island Railroad has its permanent substations constructed with a railroad siding entering each building. When one of these stations is about to be subjected to a long period of overload which is beyond the capacity of its converting apparatus, the portable substation is conveyed into the building, connections are made to the high-tension line, and the converter is paralleled with the permanent units. In like manner the portable substation is available to take the place of any permanent unit which may be temporarily out of commission. It can also be conveyed to any desired point along the railroad where the high-tension current is available and used as a separate substation during rush hours or holidays.

Collapsible Trolley Pole With Automatic Disconnecting Attachment

WITH the idea of preventing the trolley wheel from striking or catching in the overhead construction when it leaves the wire Jules Redon, engineer of the railway system at Lyons, France, and formerly chief of materials and traction of the Paris railway at Arpajon, has invented a collapsible trolley pole. It is made of two tubes which are held together by two bands or rings. Each tube carries one of these rings permanently fastened to the end of it, and is so mounted that the other tube can slide through this ring. When the pole is in the extended position it is locked by a clutch which acts on the lower ring. A cord connects the trigger of this latch to a collar mounted at the trolley base, and whenever the pole starts to rise this trips the clutch and frees the upper tubular element of the pole. The tubular element thus being released slides down the lower part giving a shorter over-all length so that it will not interfere with the overhead construction. A spring is provided to start the sliding together of the poles and when once started the upper part continues by its own weight. To restore the pole to its normal length it is only necessary to pull sharply on the trolley cord and to reset the clutch.

While a trolley pole of this type would probably not be favored for use in this country, due to its many parts and the liability of pitting action from carrying current, this particular type has been tried for several years on cars of the Paris railway at Arpajon and has given good results.

Line Truck on Ford Chassis Gives Efficient Service

Denver Tramway Builds a Truck with Hand-Raised Tower for $1,100—The Weight Complete Is 3850 Pounds

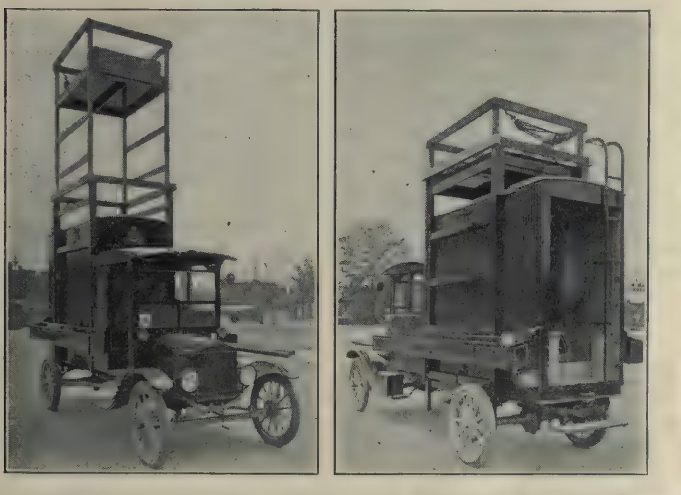
ALL of the overhead maintenance work and a large part of the overhead construction on the Denver Tramway System has been taken care of during the past two years by a 1½-ton line truck with a McCardwell tower. It was lately realized, however, that this truck could not handle the work of periodically overhauling all of the overhead lines to insure a safe condition, and in May of this year a 1-ton Ford worm-gear-driven chassis was purchased.

Due to a shortage of labor and the large amount of work being handled in the wood shops of the company, bids were received from outside contractors for the building of a suitable body designed by the company, as shown in an accompanying illustration. It was intended to have wire gates at the rear and to have the tower raised by a set of worm gears located under the body of the truck. About $125 was saved, however, by having an old set of hoisting gears fitted up and mounted on the rear end of the chassis. The wire gates at the rear were omitted and an iron ladder was mounted for access to the tower. The final cost of the truck complete was as follows:

One-ton Ford chassis, f.o.b. Denver	$648
Designing of body	50
Body complete	265
Painting	75
Miscellaneous	62
Total	$1,100

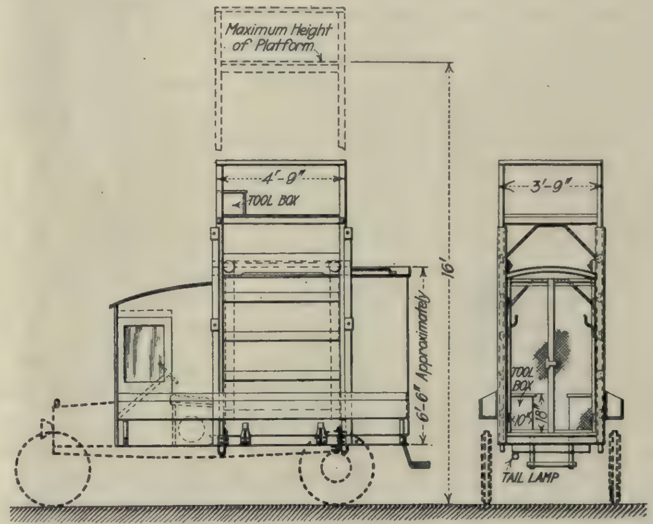
The chassis weighs 1500 lb., body 1550 lb., and the weight of the truck complete with tools and materials is 3850 lb. Three men comprise the crew, and as the truck is designed for a capacity of 4500 lb. it is never overloaded.

A 6-volt 80-amp.-hr. battery furnishes current for the side and tail lights, but the main headlights are run from the magneto, thus obviating the chance of having the battery run down and being obliged to travel without lights. A buzzer over the driver's head with push button on the platform for signaling and a receptable on the platform for plugging in a small portable lamp are also connected to the battery. These are improvements over the 1½-ton truck which is equipped with an oil torch for night work and a bell cord and motorman's signal bell for signaling. Two small mirrors are provided, one at the side to enable the driver to see traffic approaching from the rear and the other at the top of the wind shield to permit the driver to watch the linemen at work.



NEW ONE-TON LINE TRUCK FOR DENVER TRAMWAY

A Dayton Universal mechanical starter was installed on the new truck, and will materially cut down on the expense of operation as compared with the 1½-ton equipment. During 1917 an average of 3.38 miles per gallon of gasoline and an operating cost, not including gasoline and driver, of 0.3067 cent per mile were obtained with the 1½-ton truck. The cost is excessive, but may be explained by the fact that when overhauling lines the driver, not wishing to be cranking the machine all the time, made it a practice to allow the engine to run continuously while the car remained standing, and the total distance traveled might not exceed 2 miles per day. It is expected that with the starter the new truck will give an average of about 7 to 8 miles per gallon of gasoline with an operating cost of not more than 0.15 cent per mile. These figures are based upon the service rendered by several trucks of the same type in other departments.



ORIGINAL DESIGN FOR ONE-TON LINE TRUCK ON FORD CHASSIS

The new type of line truck has more room for tools and materials than does the 1½-ton truck, and both the tools and the men are kept dry going to and from work during stormy weather. The small cab windows in the front are removable, giving good ventilation in warm weather. A framed blueprint showing what materials and tools are to be carried is mounted in a convenient location in the truck, so that there is no excuse for any shortage of equipment. Broken or defective tools are replaced at the storeroom. Small tools used in changing gears, switches, crossings, etc., are carried in a tool box on the top platform and two pairs of small blocks are also carried on the top hooked into rings fastened to the railing of the platform.

The stability of this truck is much better than might be expected, and while not equal to that of the heavier 1½-ton truck, is a great deal better than the old horse-drawn type of line wagon.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE · PERSONAL MENTION · CONSTRUCTION NEWS

Amalgamated on Women

Ruling of the Executive Board on This Matter Stated in Letter to Local Division

The position of the Amalgamated Association of Street & Electric Railway Employees of America on the question of employment of women as conductors on electric railways was fully defined by the general executive board at the regular semi-annual meeting, held at headquarters, Detroit, Mich., Aug. 19-23, 1918. The policy of the association on this question, as laid down by the general executive board and approved by W. D. Mahon, international president, is defined in the following letter issued to all local divisions of the association:

TEXT OF LETTER

"The members of the general executive board of your association have had before them the question of the employment of women as conductors by the various street railways with which we have contracts. You are aware that the question of employing women as conductors was brought up by some of the companies as soon as the government declared war, and before a man had left our shores for Europe some companies were advocating that women be employed as conductors. Your association opposed this proposition, claiming that the time had not yet come for the employment of women as conductors upon the street and electric railways of America. These early agitations on the part of the companies for the employment of women were, in our opinion, an attempt upon their part to use women in order to reduce wages and demoralize, if possible, our organization. However, the situation has changed and many of the companies are now claiming that it is impossible to continue the operation of their cars unless we allow women to be employed.

CAR NO PLACE FOR A WOMAN

"We still contend that the position of conductor of a street or electric railway car is not the place for a woman, and that she should not be put in that position unless it becomes absolutely necessary. But in order to remove any criticism that may be placed upon our association, or any wrong impression that may be given the government as to the attitude of our association, we hereby instruct all of our local divisions as follows:

"That if it is necessary, during the period of the war, that women be employed as conductors on the cars, they be accepted into employment as follows:

"1. Where women are employed as conductors they shall be employed and enter the service the same as men were employed.

"2. They shall take their seniority, starting at the foot of the extra list and working up the same as men would work up in the employment.

"3. They shall be entitled to the same guarantees, the same wages and conditions that the men are entitled to.

"4. They shall, when employed on systems that require permits to be taken out, take their permits for membership in the organization the same as the men take permits.

"5. That when women do enter the service they shall become members of the organization, being entitled to the same protection, benefits and conditions that men are entitled to, coming under the working conditions and provisions of the agreement in the same manner."

Will Help on Questionnaire

To aid its employees in compiling their draft questionnaires, the Philadelphia (Pa.) Rapid Transit Company on Sept. 10 established a bureau at 1242 Land Title Building, that city, under the supervision of Ellis Ames Ballard, general counsel for the company, with C. B. Fairchild in charge.

In a statement to heads of departments, T. E. Mitten, president, said that the attitude of the transit company toward the new draft law "must be one of highest patriotism."

"The company, as well as its employees, must recognize the fact that the demand for man power to prosecute the war will come before all other considerations," Mr. Mitten stated.

"It will also be in order at this time to inform you that the Philadelphia Rapid Transit Company is an essential industry, the best evidence of which is the fact that the government has, during the past few months, advanced upwards of $4,000,000 to enable the company to improve and maintain transportation service to the important Government plants located here, and the management of the company will take proper steps to protect its men who are essential to the maintenance of good service from being transferred to other lines of industrial employment.

"Military service must come first. At the same time, essential industries must render effective assistance. Our men who secure deferred classification or are not called into active military service, should not leave their essential jobs with the Philadelphia Rapid Transit Company to seek service in other industries."

Women to Continue

Arbitrators in Cleveland Decide Upon This Course Pending Their Final Report on Question

H. B. Deihlman and Miss Margaret Russanowska, detailed by the Federal Secretary of Labor to investigate the necessity of employing women as conductors on the Cleveland (Ohio) Railway, announced on Sept. 9 that the women employed in this capacity may continue to hold their places during the investigation. One of the demands of the union was that they should be dismissed temporarily pending decision upon the main question.

INTEREST OF PUBLIC FIRST

In announcing their decision, the government agents said that the interests of the traveling public demand that the women shall remain at their posts until the main issue is settled. They said the withdrawal of the women at this time would cripple the service.

J. J. Stanley, president of the railway, announced that 115 women are now employed as conductors and that as many more are in training. The ruling of the government agents, he said, means that the rush-hour trips for the accommodation of the war workers will be continued.

The investigators began their work on the question of the permanent need of employing women on Sept. 10. They said that this subject will be held primarily in view, but at the same time their investigation would include general labor problems. It is expected that a thorough examination will be made of the rights of both the company and its employees, as they relate to the employment of labor.

ARBITRATION AGREED TO SEPT. 4

The agreement to submit the dispute to two representatives of the Federal Department of Labor for adjustment was reached by the company and the representatives of the union on the evening of Sept. 4, and the threatened strike was averted. Secretary of Labor Wilson named H. B. Deihlman and Miss Russanowska to act as mediators. They arrived in Cleveland on the morning of Sept. 5.

A. L. Faulkner, representative of the Federal Department of Labor in the Cleveland district, was instrumental in bringing about this plan of settlement. Mr. Faulkner contended that the question involved did not warrant a strike, as an investigation as to the need of employing women on the cars could be made while they were at work as well as if they were temporarily removed.

In Class Two Under Priority Order

Electric Railways and Manufacturers of Railway Apparatus Placed There by War Industries Board

Electric railways, electric light and power plants and other public utilities and plants engaged principally in manufacturing equipment for railways and other public utilities are all included in Class II in the preferential list of industries and plants compiled by the priorities division of the War Industries Board and made public on Sept. 9.

PREFERENTIAL LIST THE MASTER-KEY

The preference list of industries and plants is the master-key governing the flow of basic industrial elements to the industries essential to the war program. It supersedes all previous listing. It is the basis for industrial exemption from the draft and may be regarded as the governing factor in the distribution of labor, capital, facilities, material, transportation and fuel.

The priorities division has grouped major industries according to their relative importance into four great classes, consideration being given in this grouping to these factors: (1) Intrinsic importance of the product for use during the war and the urgency; (2) necessity for maintaining or stimulating and increasing the total quantity of production; (3) proportion of the capacity of the industry or plant devoted to the production of essential products. Each industry or plant is given a class number.

The inclusion of the industries and plants on this preference list does not operate as an embargo against all others, but the effect is to defer the requirements of all other industries and plants until the requirements of those on the preference list shall have been satisfied. The paramount purpose of priorities is the selective mobilization of the products of the soil, the mines and the factories for direct and indirect war needs in such a way as will most effectually contribute toward winning the war.

In listing industries as such or individual plants, while a number of factors are taken into account, the ultimate test is: To what extent, if at all, will according preference contribute directly or indirectly toward winning the war; and, if at all, how urgent is the need.

ALL PRIORITY RELATIVE

A high priority classification does not always mean that the product of the industry of plant so classified is of greater intrinsic importance than those of industries and plants in a lower classification or not appearing at all on the preference list, but that taking into account the urgency of the demand and the relation of supply to demand, it is in the public interest that the artificial stimulus of priority should be applied. All priority is relative and implies purposeful discrimination.

The decisions of the priorities board are subject to review only by the chairman of the War Industries Board and by the President.

For the guidance of all governmental agencies and all others interested in (1) the production and supply of fuel and electric energy, (2) in the supply of labor, and (3) in the supply of transportation service by rail, water, pipe lines or otherwise, in so far as such service contributes to production of finished products, preference list No. 2 has been adopted by the priorities board superceding preference list No. 1 adopted on April 6, 1918, and all amendments and supplements thereto.

The industries and plants grouped under Class I are only such as are of exceptional importance in connection with the prosecution of the war. Their requirements must be fully satisfied in preference to those of the three remaining classes.

Requirements of industries and plants grouped under Class II, Class III, and Class IV are to have precedence over those not appearing on the preference list. As between these three classes, however, there is to be no complete or absolute preference. The division into classes is for the purpose of presenting a composite picture of the relative importance of the industries and plants embraced within each group. It is not intended that the requirements of Class II shall be fully satisfied before supplying any of the requirements of Class III, or that those of Class III shall be fully satisfied before supplying any of those of Class IV. The classification does, however, indicate that the industries and plants grouped in Class II are relatively more important than those in Class III and that those in Class III are relatively more important than those in Class IV. It will often happen that after satisfying the requirements of Class I the remaining available supply will be less than the aggregate requirements of the other three classes, in which event such supply will be rationed to the industries and plants embraced within those classes. In determining a basis for such rationing the relative importance of each industry and plant, according to its class rating, must be considered. It has been found impracticable to prescribe for rationing purposes any general and uniform rule or formula, but the priorities board will from time to time, after conference, and in cooperation with each of the several governmental agencies charged with the distribution thereof, determine particular principles, values and methods of application which may be followed in allocating fuel, power, transportation and labor respectively, to the end that proper recognition and weight may as far as practicable in each case be given to the relative importance of Class II, Class III and Class IV.

Each plant listed as such shall not later than the fifteenth of each month file with the secretary of the priorities board, Washington, D. C., a report on P. L. Form No. 3 (a supply of which will be furnished on application) covering its activities during the preceding month. Any plant failing to file such report will be dropped from the preference list.

Priorities in the supply and distribution of raw materials, semi-finished products and finished products shall be governed by Circular No. 4 issued by the priorities division of the War Industries Board under date of July 1, 1918, and all amendments and supplements thereto or substitutes therefor.

No Referendum in Cincinnati

There will be no referendum vote on the revised franchise ordinance granted the Cincinnati (Ohio) Traction Company by the City Council. That was the decision of representatives of the citizens' committee, the city and the company at a conference in Mayor Galvin's office on Sept. 6. The proposition came from W. J. Schultz, chairman of the referendum committee of the citizens' committee. He first agreed to withdraw the committee's plan for a referendum vote on condition that Mayor Galvin issue a proclamation that the rate of fare will not exceed 6 cents during the period of the war and for one year thereafter. The Mayor said he could not issue such a flat guarantee as that, since he could not tell what conditions will prevail after the war, but that he would issue such a proclamation with the following limitation: "Assuming that substantially normal pre-war conditions will be restored."

W. Kesley Schoepf, president of the Cincinnati Traction Company, urged all parties to get together on an agreement, after this proposition was made. He said: "Don't let us leave the building to-night without arriving at a solution that will be satisfactory to every one. There is no difference in principles between the company and its employees. They maintain that they are entitled to more pay. We admit that their position is justifiable. The only question is what amount of increase shall be granted, and I am sure that we can arrive at an agreement. Mr. Schultz's proposal suggests a solution, and I feel sure that it can be reached before the day is over. Let us recess for an hour and work out something that will be acceptable."

Representatives of the parties interested met during the recess suggested by Mr. Schoepf and formulated an agreement that was later adopted. This, it is believed, will do away with any further delay in an adjustment of the wage scale and it will put the company in a position to take care of its business with a certainty that it will receive proper protection. The revision continues over a period of thirteen years.

Seattle Matter Unsettled

The city of Seattle, Wash., through Mayor Hanson and the City Council has definitely refused to agree to the proposition offered by the United States Shipping Board representatives in Seattle, providing for the unification of the lines of the Puget Sound Traction, Light & Power Company, Seattle & Rainier Valley Railway and the municipal railway system, the operation of the lines by a committee composed of a representative each of the three interests, 6-cent fare for a straight ride, and 7-cent fare where transfers are required.

In refusing the offer, the city states that such a step would be illegal, and also that the joint operation of the cars by a committee in which the city would be the minority is inexpedient. The city, on the other hand, has sent to the officials of the Puget Sound Traction, Light & Power Company, its ultimatum in regard to the traction situation, demanding that the company accept the city's offer to lease its railway lines and equipment during the period of the war, and thus provide satisfactory service to the city.

The Puget Sound Traction, Light & Power Company and the Seattle & Rainier Valley Railway were prompt in accepting the offer of the Shipping Board to operate the railway lines under the plan suggested.

The Mayor and the City Council, in answering the communication of the Shipping Board, state that such a move as proposed would be illegal, and that the city is asked to assume authority which it does not possess, but which rests with the Public Service Commission, such as the granting of permission to increase fares, and delegation of authority to control the affairs of the municipal street railway. The city urges that the Shipping Board direct the railways to accept the solution offered by the city, namely, that of leasing the traction lines.

Wages Increased in New York

Increased wage scales for employees of the Interborough Rapid Transit Company, New York, N. Y., and of the New York Railways were made public on Sept. 10 by Theodore P. Shonts, president of both companies. The total increases granted the 22,000 employees of the companies aggregate $3,750,000 a year. Of this amount $2,500,000 goes to the 15,000 employees of the Interborough Company, and the remainder is divided among the 7,500 employees of the Railways Company. The average increase in wages amounts to 20 per cent.

In announcing the higher wages, Mr. Shonts said that they were granted in anticipation of receiving authorization to charge more for fares on all of the lines of both companies, which include the elevated, subway, and surface roads. He added that the expenses of operating railroads this year would probably be one-third more than last year.

News Notes

Next Winter's Snow.—Earl Godwin in his column in the Washington *Times* of Sept. 9 says that next winter's snow is bound to fall and recommends to the local executives that they paste in their hats the second paragraph from the editorial on snow fighting on the first reading page of the ELECTRIC RAILWAY JOURNAL for Aug. 31 and that they act on the advice.

Winnipeg to Arbitrate.—In connection with the demand of the union of employees of the Winnipeg (Man.) Electric Railway for increased rates of pay, viz., hour rates of 47 cents for the first three months' service; 55 cents for the next nine; 60 cents after the first year; time and a half for overtime, with the day as at present of nine hours, the committee announced on Sept. 3 that it had no desire to involve Winnipeg in the annoyance and general inconvenience of a strike, and with the object of amicable settlement it was decided by the union and the company to submit the matter to arbitration.

Michigan Men to Arbitrate.—Following a session on Sept. 1 of the joint advisory board of the trainmen of the Michigan Railway at which a proposition to submit the question of the legality of the findings of the arbitration board in the wage dispute to Messrs. Taft and Walsh, of the Federal War Labor Board, was presented by J. F. Collins, general manager of the company, it was decided to accept the plan. The trainmen, dissatisfied with the wage award of the arbitration board, had given notice to the company that unless some action was taken on their demands for more pay they would strike. The men asked that the question be submitted to the War Labor Board.

Capital Traction Increases Wages.—The Capital Traction Company, Washington, D. C., has followed the lead of the Washington Railway & Electric Company and has agreed to raise the wages of the men to a minimum of 43 cents and a maximum of 48 cents an hour. The present maximum is 38 cents. J. H. Hanna, vice-president and general manager of the Capital Traction Company, said a few days ago that the increase had been agreed upon but that the conferees of the union and the company were still considering certain matters of working conditions, which prevented an agreement on the whole. Whether or not his company would join the Washington Railway & Electric Company in a request for an increased fare, he said, was a matter that awaited the complete adjustment of the labor matters.

Wages and Fares Coupled in St. Louis.—A request for more wages made on Aug. 27 by employees of the United Railways, St. Louis, Mo., was refused on Sept. 4 by President Richard McCulloch, who wrote a letter to Anthony O. Piant, president of the employees' union, in which he gave the company's reasons. Mr. McCulloch says it would be futile to submit the wage matter to the National War Labor Board as that body has announced that it has no authority over revenues or rates of fare. He suggests that the association join with the company in presenting all the facts to the State Public Service Commission whenever that commission considers the present application of the company, so that the commission may be fully informed and may be in a position to pass both upon the fairness of the wages and the fairness of the rates of fare.

Short Strike in Champaign.—After a two-and-a-half day strike, precipitated by trainmen in the employ of the Urbana & Champaign Railway, Gas & Electric Company, service was resumed in Champaign and Urbana, Ill., on Sept. 5 pending consideration of a proposition to be submitted by the company within fifteen days from resumption of service. A portion of the employees of the company, which is included in the Illinois Traction System, are members of the Amalgamated Association and made demand on Aug. 28 for a number of concessions, including a "closed shop," nine-hour day, and wage scale of from 44 cents to 48 cents an hour, to replace the current scale from 32 cents to 36 cents an hour. Without notice the members of the organization failed to report for duty on Sept. 3. The company made no effort to run its cars, and Champaign and Urbana were without service for two and a half days.

Lexington Company States Its Case.—The Kentucky Traction & Terminal Company, Lexington, Ky., has given out a statement reviewing the refusal of the union to accept Mr. McElroy, the umpire appointed by Governor Stanley. This statement concludes as follows: "Under the agreement signed three years ago, it was stipulated that at the expiration of the present contract, which expired this July, if the company and the union could not reach an understanding, any controversy arising should be settled by arbitration, the company and the union to select an arbitrator and the Governor to name an umpire in case the representatives of each side failed to agree on the terms for a renewal of the contract. Mr. Sutherland (president of the union) was then a member of the executive committee, which signed that agreement, and the company stands ready to live up to it to-day, but the action of the arbitrator for the union and of President Sutherland in declining to enter into arbitration looks as if the union does not respect the provisions of that agreement."

Financial and Corporate

St. Louis Also Hit

Burdens of Higher Operating Costs Overwhelmed the Revenue Gains in 1917

The United Railways, St. Louis, Mo., is another company whose increases in operating costs in 1917 outran the gains in revenue. As shown in the accompanying statement, the passenger revenue for 1917 showed an increase over 1916 of $490,167 or 3.92 per cent. Other transportation revenue, however, decreased $403.57 or 1.34 per cent, while revenue from other railway operations decreased $5,497 and non-operating income increased $12,113. The gross operating revenue and other income gained $496,379 or 3.90 per cent.

COMPARATIVE INCOME STATEMENT OF UNITED RAILWAYS OF ST. LOUIS FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation	$13,038,622	99.3	$12,548,859	99 3
Revenue from other railway operations	86,937	0.7	92,434	0.7
Gross operating revenue	$13,125,559	100.0	$12,641,293	100 0
Current operating expenses	$7,625,827	58.1	$6,953,124	55 0
Depreciation	1,575,067	12.0	1,516,955	12 0
Taxes	853,161	6.5	821,684	5.5
Total	$10,054,055	76.6	$9,291,763	73.5
Income from operation	3,071,504	23.4	3,349,530	26.5
Non-operating income	94,702	0.7	82,588	0.6
Gross income	$3,166,206	24 1	$3,432,118	27.1
Interest and miscellaneous charges	2,523,230	19.2	2,544,613	20.1
Net income	$642,976	4.9	$887,505	7.0

Operating Expenses Up $730,814

The operating expenses (including depreciation) increased $730,814 or 8.63 per cent compared with 1916. Interest charges decreased $21,383 or 0.84 per cent, owing mostly to the retirement of $1,000,000 of St. Louis & Meramec River Railroad 6 per cent bonds which matured on May 8, 1916, and $299,000 of Southern Electric Railroad 5 per cent bonds which matured on Aug. 1, 1916.

The amount of money paid out in wages was $4,668,366, or 35.57 per cent of the gross operating revenue. The current operating expenses were $7,625,827, as compared with $6,953,124 in 1916, an increase of $672,702 or 9.67 per cent. The increases were as follows:

Way and structures	$44,234
Equipment	145,444
Power	105,522
Conducting transportation	274,437
General and miscellaneous	110,468
	$680,106
Less—decrease in traffic expense	7,403
Net increase	$672,702

The increase in operating costs is ascribed to the increase in wages. the rate of pay having been increased twice during the year, to the increase in the price of coal, the price averaging 53 per cent higher than in 1916, and to an increase in the price of all materials used in the operation and maintenance of the property. It is roughly estimated that of the increase in operating expenses, $350,000 was due to increase in rate of wages, $100,000 to increase in price of coal, and $200,000 to increase in price of supplies.

The total capital expenditures during 1917 were $293,495, with offsets of $158,340 for property retired or sold, leaving a net increase of $135,134. The car mileage in 1917 was 444,076,753 car miles as compared with 43,649,328 car miles in 1916. The passenger totals in the two years were 403,300,696 and 389,112,152 respectively. The percentage of revenue passengers using transfers in 1917 was 53.60, and the average fare per ride was 3.23 cents. The 1916 figures were 53.77 per cent for transfers and 3.23 cents for the average fare per ride.

Suspends New Security Offerings

The Capital Issues Committee, in Washington, has adopted a resolution announcing that during the period from Sept. 15 until after the close of the Fourth Liberty Loan campaign it would not pass upon any application respecting the sale or offer of new securities, excepting applications which the committee might regard as "urgently necessary."

Investment houses, brokers, corporations and others offering unsold portions of security issues heretofore passed by the Capital Issues Committee are asked to withdraw the same from public offering or solicitation during the period from Oct. 1 to the close of the Liberty Loan campaign. The committee announces that this action "is not intended to restrict counter sales or sales of listed securties made in ordinary course of business on stock exchanges."

Principal In Default

Eastern Power & Light Corporatio Unprepared to Meet Collateral Trust Notes Maturing Sept. 1

Holders of the 7 per cent collater trust notes of the Eastern Power Light Corporation, New York, N. Y due on Sept. 1 and the 5 per cent conver tible gold bonds of that company whic matured on March 1, 1918, have bee asked to deposit their holdings wit the Equitable Trust Company, Ne York, N. Y., under an agreement whic makes provision for their exchange return for negotiable certificates deposit.

Personnel of Bond Committee

A bond committee consisting of O. Willcox, who is chairman of the boa of the company; H. E. Cooper and C. Rorick has been formed. On Mar 1, 1918, an issue of $2,327,000 of 5 p cent gold bonds matured and their e tension was provided for in the ho that some relief could be obtained fro the War Finance Corporation. Ninet two per cent of the bondholders e changed their holdings for 7 per ce collateral trust notes due on Sept. which the company in turn found self unable to meet on maturity.

A stockholders' protective committ consisting of W. P. Bonbright, chai man; W. S. Barstow and George Lee has also been formed and holde of preferred stock and voting tru certificates for the common stock a asked to deposit their holdings wi the New York Trust Company and r ceive in exchange transferable ce tificates of deposit.

In a letter summarizing the situatio J. B. Taylor, president of the compan points out that during the six mont ended June 30 operating costs ha been mounting out of all proportion revenues. The cost of supplies has i creased more than 100 per cent, a wages have risen 50 per cent in the la two years, half of the increase comi in the last six months. Further i creases in operating costs can be e pected in the future, according to M Taylor.

$900,000 of Floating Debt

The company has a floating debt $900,000 which must be met soon. Th was incurred in making advances subsidiary companies for extensio and improvements and is secured notes of these companies. With som readjustments, Mr. Taylor believe some of the subsidiaries (power a coal companies) are capable of earnin their own fixed charges and a surpl sufficient to meet fixed charges of t parent company.

Among the properties controlled the company are the Reading Trans & Light Company, Oley Valley Railwa Neversink Mountain Railway, Clar mont Railway & Lighting Compan Claremont, N. H., and the City Railwa Wheeling, W. Va.

Chicago Financial Program

Proposals for Readjusting Capitalization of Unified Companies Under Pending Resettlement Franchise

Considerable interest attaches to the financial provisions of the Chicago traction ordinance, summarized in the Aug. 24 issue of the ELECTRIC RAILWAY JOURNAL. While several steps are yet to be taken before the measure is certain of becoming effective, the extent of the financial program, involving the raising of about $500,000,000 during the life of the franchise, makes the plan unusually striking.

CAPITAL ACCOUNT $220,114,428

The recognized capital account of the combined surface and elevated companies as of June 30, 1916, is $220,114,428, and the present outstanding securities will have to be scaled down to this figure except for allowances for additions to capital approved during the past two years. The pending franchise provides that securities for 60 per cent of this valuation may be in the form of bonds with an interest allowance of 5 per cent, and the balance shall be covered by debentures having no lien on the properties and subject to payment from the proceeds of sale to the city. These debentures are to bear interest at 8 per cent up to July 1, 1932, and 7 per cent thereafter.

The Chicago Railways on Jan. 31, 1918, had outstanding bonds amounting to $96,241,465. There was also $100,000 of capital stock subject to 265,100 participation certificates of the predecessor company. It is expected that $55,655,000 of first mortgage bonds and $16,397,800 of Series A bonds will be fully taken care of under the city's guarantee. More than 84 per cent of the $16,936,475 of Series B bonds are also within the valuation and subject to working out of details which practically place the entire issue in a guaranteed position in the event of the city not purchasing the property. The Series C bonds, $903,336, will all be retired by the operation of a sinking fund. As to the remaining bonds, it is expected that if the city does not purchase the property and thus stop the income return on the agreed valuation, they will be subject gradually to retirement through amortization.

INTIAL RETURN 6.2 PER CENT

Under the old ordinance the life of all securities ended in 1927. The new franchise will give an average return of 6.2 per cent up to 1932 and 5.8 per cent thereafter. This guarantee is understood to assure full payment of 8 per cent on Series 1 participation certificates and approximately 3 per cent on Series 2 up to 1932. After that date both series will automatically disappear. Series 3 and 4, which have had no return under the present ordinance, will also be valueless under the proposed measure.

The Chicago City Railway had on Jan. 31, 1918, $33,900,000 of first mortgage bonds and $18,000,000 of capital stock. Of the latter, 94 per cent is pledged with the trustee of the Chicago City & Connecting Railways Collateral Trust. The Chicago City Railway bonds will have an assured guarantee as to principal and interest under the new franchise. The Chicago City & Connecting Railways issue of $21,456,000 of bonds will also be taken care of in full. The $25,000,000 of 4½ per cent preferred certificates of Chicago City & Connecting Railways stand to earn up to 1932 better than $3.50 a share and after that date better than $2.50 a share in perpetuity or until city purchase. The common certificates of $15,000,00 probably would have no value.

The Chicago Elevated Railways have a recognized valuation of $70,943,020 included in the total given above. The securities of the four elevated railway companies are held by the Chicago Elevated Railways Collateral Trust. The $14,000,000 of two-year notes of this voluntary association and the $7,000,000 of ten-year debentures, together with the floating debt, come within the agreed valuation. It is expected also that the $16,000,000 of preferred stock will receive up to 1932 a return of 4 or 5 per cent. After that date there will be a less return. It is not likely that the $25,000,000 of common stock will have any value under the new arrangement.

It has been stated that no effort will be made to agree upon a plan for the distribution of the new securities as between the various companies until after voters shall have passed upon the new ordinance at the referendum next November.

Receiver for Paducah Properties

Acting upon a petition brought by W. F. Bradshaw, of the Mechanics' Trust & Savings Bank, as trustee, upon failure of the Paducah Traction Company to meet interest on bonds of the People's Railway, Light & Power Company, Circuit Judge W. M. Reed has named Roscoe Reed as receiver for the Paducah Light & Power Company and the Paducah Traction Company.

The receiver has requested A. S. Nichols, present manager, to continue the operation of the properties pending further developments. The appointment of a receiver was not unexpected and is the direct result of conditions due to the war, attending the operation of the companies. High cost of material and labor, together with slender revenues, combined to force operation at a loss.

After a long fight the traction company was recently granted a 6 and 7-cent fare, but the added revenue proved insufficient to balance the increased cost of operation.

12 Per Cent Increase in Revenue

Kansas City Fare Increase Figures for First Four Weeks of Operation Show Interesting Facts

As has previously been announced in the columns of this paper, the Kansas City (Mo.) Railways began the collection of a 6-cent fare in Missouri on July 15. The accompanying figures present the statement of earnings beginning on that date and covering a period of four weeks. An analysis shows that, as compared with the week before the increase was put into effect, that being considered an average week as to earnings, etc., there was for the average of the four weeks a decrease in adult passengers amounting to 568,917 or 6.7 per cent and an increase in total cash fares equal to 11.5 per cent.

STATEMENT FROM KANSAS CITY RAILWAYS FOR WEEKS BEGINNING MONDAY, JULY 15, TO AUG. 11, 1918, COMPARED WITH WEEK BEGINNING JULY 8, 1918

	—Adult Passengers—		Passengers Carried on 2½-Cent Tickets			—Total Cash Fares—		Per Cent Increase	Per Cent Increase Over
Week Ending	Weeks Since Increase	Week Before Increase	Weeks Since Increase	Week Before Increase	Passengers Affected by Increase	Since Increase	Week Before Increase	Week 7/8 to 7/14/'18	Week 7/16 to 7/22/'17
				MISSOURI					
July 21......	2,011,857	2,132,528	56,190	55,433	1,995,217	$121,949	$108,214	12.69	11.49
July 28......	1,967,914	2,132,528	55,795	55,433	1,946,053	119,251	108,214	10.20	9.02
Aug. 4......	2,012,971	2,132,528	59,641	55,433	1,990,262	122,042	108,214	12.78	11.57
Aug. 11.....	1,968,453	2,132,528	53,250	55,433	1,946,671	119,220	108,214	10.17	8.99
Total......	7,961,195	8,530,112	224,876	221,732	7,878,203	$482,463	$432,857	11.46	10.26
				KANSAS					
July 21......	483,135	443,690	5,444	5,746	242,936	26,722	22,328	19.68	23.04
July 28......	451,983	443,690	5,512	5,746	240,382	25,140	22,328	12.70	15.87
Aug. 4......	451,800	443,690	5,528	5,746	239,673	25,124	22,328	12.53	15.69
Aug. 11......	452,786	443,690	5,520	5,746	227,206	25,049	22,328	12.19	15.34
Total......	1,839,704	1,774,760	22,004	22,984	950,197	$102,037	$89,312	14.16	17.48

The fare increase has not been applied to Kansas City, Kan., riders who do not cross into Missouri, of whom the report shows there are 52 per cent, and there has been an increase in adult passengers in Kansas amounting to 3.7 per cent with a total increase in cash fares equal to 14.2 per cent—2.7 per cent more than in Missouri, where the 6-cent fare applies.

The increase in passengers in Kansas was found to be made up from part of the decrease in Missouri, the explanation being as follows: There is employment for a large number of men a few blocks from the State line on the

Missouri side. The majority of these laborers live on the Kansas side, and have, of course, been in the habit of paying fares in Kansas going to their work, and in Missouri going home at night. Since the introduction of the increase in fares, all cars going from Kansas to Missouri have been stopped at the State line and the extra cent collected by special collectors. Many of the laborers, some actuated by a saving instinct, but the majority probably feeling antagonistic toward the increase, got off at the State line and walked to their work, and in the evening walked to the State line before boarding the car. This took a number of fares away from the Missouri side and added them to the Kansas side. The outcome of this development may be indicated by the first column under the Kansas figures, which shows that the increase in adult passengers dropped from 8.9 per cent the first week to 1.9 per cent the second week. The remainder of the decrease in traffic on the Missouri side is attributed only in small part to a direct result of the fare increase, it being believed that severe weather conditions, a steady depletion of the riding man-power of the city, and several other local conditions, have exerted a greater influence.

The average increase in total cash fares for the four weeks period for Kansas and Missouri combined is approximately 12 per cent.

Financial News Notes

Public Sales of Notes Successful.—The Wisconsin Gas & Electric Company, Milwaukee, Wis., has recently sold $200,000 of five-year 6½ per cent notes over the counter and principally to its customers. These notes were issued in denominations of $50, $100, $500 and $1,000.

Car Bonds Authorized.—The public utilities committee of the Council of Seattle, Wash., recently voted to recommend the passage of the ordinance transferring $217,000 from the general fund for the purchase of cars for the municipal street railway, notwithstanding the veto of Mayor Hanson.

Abandonment Opposed.—Property owners of the Tal-Coe addition to the city of Temple, Tex., have organized for the purpose of opposing the removal of the tracks of the railway that serves that addition. This line forms a part of the Texas Traction Company, but the company ceased operating cars several months ago, and preparations had been made to remove the tracks.

Another Abandonment Planned.—The Fishkill (N. Y.) Electric Railway on Sept. 7 filed with the Public Service Commission of the Second District of New York notice that it has declared in favor of the abandonment of certain parts of its line as no longer necessary for the successful operation of the road and convenience of the public. The commission will order a hearing on the proposed abandonment of that part of the road in question.

Commission Approves Philadelphia Loan.—The Pennsylvania Public Service Commission has approved the contract between the Philadelphia Rapid Transit Company and the United States Housing Commission by which the Federal government, through the commission, will lend the company $1,740,000 to extend transit facilities for workers in war industrial plants. As outlined in the ELECTRIC RAILWAY JOURNAL for Aug. 17, page 303, the money will be used to purchase ninety additional cars and accessories.

Abandonment Meeting Called.—A special meeting of the stockholders of the Forty-Second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y., (Third Avenue Railway System), is to be held Sept. 24 for the purpose of ratifying the action of the board of directors in declaring abandoned the franchises to construct maintain and operate street surface railrods in, upon and along certain streets, avenues and highways in the Borough of Manhattan, city of New York.

Wants $750,000 Issue.—The Eighth Avenue Railroad, New York, N. Y., a subsidiary of the New York Railways has asked the Public Service Commission for the First District for authority to issue certificates of indebtedness for $750,000 for the purpose of discharging outstanding certificates issued in January, 1914. The company says in its application that it would not be able to pay off the certificates falling due, but expresses the hope that it will be able to meet the new ones before they mature. It is proposed to have the new certificates carry 6 per cent interest, payable semi-annually and to mature on Feb. 1, 1929.

Minneapolis Road to Resume.—Resumption of operation of the cut-off of the Minneapolis, Northfield & Southern Railroad from Auto Junction to Short Line Junction and thence over the Electric Short Line terminals to the station at Second Avenue N and Seventh Street in Minneapolis is planned as well as continuation of operation from Fifty-fourth Street station to Northfield. This was determined at the first meeting of stockholders in Minneapolis. J. H. Ellison, Minneapolis temporary president, was elected to that office. The new directors are: H A. Whittier, Northfield; W. F. Roche Lakeville; John B. Irwin, Richfield F. T. Day, Waseca; R. H. Benham, Orchard Gardens; W. O. Winston, J. H Ellison, W. L. Harris, C. C. Wagner A. D. Walker, Julius Rosholt, Minneapolis. Mr. Whittier was elected vice-president of the company, and Mr Winston was chosen to fill the position of treasurer.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$77,978	*$48,825	$29,153	$19,884	$9,269
1m., July, '17	71,350	*41,322	30,028	18,794	11,234
12m., July, '18	917,483	*547,003	370,480	235,094	135,386
12m., July, '17	861,585	*490,717	370,868	222,633	148,235

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$145,541	*$115,479	$30,062	$32,017	†$1,955
1m., July, '17	139,345	*90.573	48,772	29,835	18,937
12m., July, '18	1,558,279	*1,379,122	179,157	369,556	†190,399
12m., July, '17	1,337,254	*932,375	404,879	357,145	47,734

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$321,805	*$219,666	$102,139	$56,166	$45,973
1m., July, '17	320,953	*240,374	80,579	47,540	33,039
12m., July, '18	4,230,224	*3,063,517	1,166,707	624,337	542,370
12m., July, '17	3,781,218	*2,541,200	1,240,018	535,959	704,059

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$1,793,536	*$1,218,365	$575,171	$506,737	$68,434
1m., July, '17	1,586,891	*958,491	628,400	445,400	183,137
12m., July, '18	20,996,644	*13,987,285	7,009,359	5,709,642	1,299,717
12m., July, '17	18,355,019	*10,773,757	7,581,262	5,138,542	2,442,720

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Oprating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Incom
1m., July, '18	$313,326	*$193,763	$119,563	$71,342	$48,22
1m., July, '17	308,571	*183,736	124,835	66,823	58,01
12m., July, '18	3,146,389	*2,169,782	976,607	851,150	125,45
12m., July, '17	3,019,819	*1,983,379	1,036,440	812,510	223,93

EAST ST. LOUIS & SUBURBAN COMPANY, ST. LOUIS, ILL.

Period	Oprating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Incom
1m., July, '18	$377,497	*$270,935	$106,562	$67,445	$39,11
1m., July, '17	314,202	*219,015	95,187	64,757	30,43
12m., July, '18	3,927,213	*2,862,830	1,064,383	804,305	260,07
12m., July, '17	3,418,246	*2,173,588	1,244,658	768,991	475,66

GRAND RAPIDS (MICH.) RAILWAY

Period	Oprating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Incom
1m., July, '18	$109,280	*$83,945	$25,335	$19,340	$5,99
1m., July, '17	113,390	*75,897	37,493	16,348	21,14
12m., July, '18	1,281,980	*950,427	331,553	229,874	101,67
12m., July, '17	1,302,532	*868,007	434,525	208,316	226,20

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Oprating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Incom
1m., July, '18	$659,379	*††$415,669	$243,710	$190,901	$52,80
1m., July, '17	511,624	*279,043	232,581	177,586	54,99
12m., July, '18	6,965,845	*††4,318,193	2,647,652	2,169,015	478,63
12m., July, '17	5,727,598	*3,093,915	2,633,683	2,169,583	464,10

* Includes taxes. † Deficit. †† For the month $19,781; and for twelv months, $310,293 included for depreciation.

Traffic and Transportation

Brooklyn Wants Ten Cents

Would Divide Surface Railway System into Two Five-Cent Zones and Reduce Transfers

New passenger tariffs filed with the Public Service Commission for the First District of New York on Sept. 10 by the Brooklyn Rapid Transit Company divided the surface lines of the company into two zones with a 5-cent fare for each zone or a 10-cent fare for a ride in both zones. They also called for a modification of the transfer system so that transfers would be confined to each zone. The plan provided for the operation of the new schedules in thirty days, but the commission, at a meeting held on the evening of Sept. 10, issued an order deferring the new schedules for sixty days. In the meantime the commission will hold public hearings beginning on Sept. 30 to determine whether to accept or reject the new plan.

FARE AUTHORIZED BY FRANCHISE

Accordingly, the petition of the surface companies sets forth that in the tariffs filed they have "followed the decisions and opinions of the commission, as expressed in the fare case hereinabove referred to, and each of said tariffs imposes no rate of fare in excess of that authorized to be charged by the franchise agreement between municipal governments and each of your petitioners respectively and by law. In many instances the said tariffs do not impose as high a rate of fare as your petitioners respectively are authorized to charge by such contracts and law."

The petition calls attention to the injurious effects of the order of 1911 upon revenues, the increased costs of transportation occasioned by the order, the war and other causes, and the diminished and confiscatory rate of return permitted by said order and existing conditions. It refers to the companies' previous request of May 23, 1917, for a partial modification of that order and asserts that the relief then sought for "is entirely insufficient to enable your petitioners properly to maintain and adequately to operate their properties, or to get any adequate return therefrom under existing conditions."

REVENUE FIGURES PRESENTED

The petitioners refer to the financial statements indicating the falling off in revenues on surface lines and the increased cost of transportation, and add:

"Since the close of the fiscal year on June 30, 1918, the passenger receipts of your petitioners have fallen off upward of $400,000 below the passenger receipts for the same period of the preceding year, while the operating expenses are constantly increasing, as indicated in the evidence before you, to which you are respectfully referred. Since Aug. 2, 1918, wages of employees have been raised to rates which will represent an additional yearly expenditure of considerably more than $1,000,000. This situation cannot continue without financial embarrassment and additional public inconvenience.

"Additional relief to that herein sought will be required, and this is being requested in an application before the Board of Estimate & Apportionment for the right to increase the unit of fare from 5 to 7 cents; but your petitioners ask as a measure of immediate justice the relief involved in the application hereby made, which is within the legal power of the commission to approve."

Under the new tariffs transfers will continue to be issued at about fifty-seven locations.

Court Hears Columbus Case

Federal Judge D. C. Westenhaver, of Cleveland, heard arguments in the legal fight between the Columbus Railway, Power & Light Company, Columbus, Ohio, and the city of Columbus during the week ended Sept. 7. The company has, as already stated, increased its rate of fare to 5 cents and is endeavoring to have its franchise abrogated, on the ground that the terms of the grant are confiscatory and that the company cannot operate under them without encountering financial trouble.

J. S. Clark, representing the E. W. Clark Management Company, operating the road, contended in court that the franchises granted in 1901 merely give the company the privilege of operating on the streets and that they may be terminated at any time by ceasing operation. On certain streets the company claims perpetual franchises, but on others it has only rights.

Henry L. Scarlett, city solicitor, accused the company of unfairness. He said that it was willing to operate during the prosperous years when profits were considered satisfactory, but wanted to surrender its rights when profits failed to materialize. He also claimed the company had failed to furnish the city with an appraisal of its plant, as requested. Judge David C. Pugh said the company sought to tear up it agreement with the city when it suited the company to do so.

It is said that a few people continue to ride without paying fare.

Only Legislature Has Power

In Matter Involving Tacoma's Seven-Cent Fare United States Attorney Holds Legislature Has Power

United States Attorney Robert C. Saunders on Sept. 5 stated in an opinion rendered upon request of the Attorney General at Washington, D. C., that the 7-cent fare now being charged in the city of Tacoma, Wash., by the Tacoma Railway & Power Company, is not legal.

OPINION BASED ON STATE LAW

Prosecutor Saunders' opinion is based on the State law, which says that fares in cities in Washington never shall be more than 5 cents, and also upon a decision of the State Supreme Court which says that the power to increase such tariffs is vested in the Legislature. Mr. Saunders expresses the same belief as that of Mayor Hanson of Seattle in his answers to proposals by the Puget Sound Traction, Light & Power Company to increase fares in Seattle to 6 or 7 cents.

Prosecutor Saunders stated that the Attorney General at Washington had also asked for an opinion from the United States Attorney of Oregon on the advance in city railways in Oregon.

It is stated by Mr. Saunders that the Attorney General asked for his opinion upon a request from Postmaster General Albert S. Burleson, who recently received a letter from Alice Thorsen, who is a well-known club woman of Tacoma, raising the question of the legality of the advanced fares in Tacoma. Miss Thorsen expressed the belief that the Government was being defrauded through the demand being made upon letter carriers for extra fare on Tacoma cars. Mr. Saunders said in part:

"Street car companies desiring to raise their rates in this State must seek their relief from the Legislature. The power to advance such rates does not rest with the city, the Public Service Commission or with the courts.

SAYS STATE LAW IS PLAIN

"The State law is plain. Section 25 of the Public Service Commission law, passed by the Legislature in 1911, says fares never shall be more than 5 cents for one continuous ride in any city in the State. This and other related matters last spring were tested in the courts. In the case of the State ex rel the Tacoma Railway & Power Company, the Supreme Court on April 7, 1918, held that the remedy for relief from franchise obligations on an application for increased fares, that it might give adequate and sufficient service, rests with the Legislature."

The 7-cent fare in Tacoma was authorized by the City Council on July 6. It was decided that the matter was one of a war emergency and should be put on that basis. The principal features of the ordinance were reviewed in the ELECTRIC RAILWAY JOURNAL for July 20, page 130.

Increases in North Carolina

Review of Fare Conditions in That State as They Affect the Railways There

A report from the North Carolina State Committee to the National Committee on Public Utility Conditions, Washington, made under date of Aug. 15, announced the following increases in fares:

MANY CITIES AFFECTED

Tidewater Power Company, Wilmington, N. C., 7-cent cash fares and four tickets for 25 cents. Company may sell seventeen tickets for $1 effective latter part of June, 1918.

Carolina Power & Light Company, Raleigh, N. C., 7-cent cash fares and four tickets for 25 cents, with discretionary privilege of selling seventeen tickets for $1.

The Southern Public Utilities Company, Winston-Salem, N. C., 7-cent cash fares and four tickets for 25 cents, with discretionary privilege of selling seventeen tickets for $1.

The Southern Public Utilities Company, Charlotte, N. C., 7-cent cash fares and four tickets for 25 cents, with discretionary privilege of selling seventeen tickets for $1.

The Durham Traction Company, Durham, N. C., 7-cent cash fares and four tickets for 25 cents, with discretionary privilege of selling seventeen tickets for $1.

None of the companies is selling seventeen tickets for $1.

The increases were granted by the State Corporation Commission.

The Carolina Power & Light Company, Asheville, N. C., has eliminated all cut fares, and is on a strictly 5-cent cash fare basis. This was arranged locally at Asheville.

The North Carolina Public Service Company, operating in Greensboro, High Point, Salisbury-Spencer, and Concord, has eliminated all reduced rate tickets, and is operating on a 5-cent cash fare basis, pending a decision on its appeal for a 7-cent fare.

TWO SMALL COMPANIES STAY OUT

This leaves the small companies at New Bern and Goldsboro as the only ones which have made no move for relief. Goldsboro is quasi-municipal. These cities only operate two or three one-man cars. In Gastonia the Piedmont & Northern Railway, which operates there, has obtained permission to charge 7 cents.

R. L. Lindsey, vice-president and general manager of the Durham Traction Company, chairman of the North Carolina committee, says that company's application for additional revenue included an appeal for relief from ordinances requiring the operation of cars with two men and fixing certain other standards. Its appeal to the commission in these respects resulted in a memorandum to the effect that the company should be allowed to operate on a schedule dependent on the amount of traffic and need for service in different parts of the city. The commission also said that it did not think that operation with two men should be insisted on in time of war. The city authorities have not repealed the ordinance, but since the fare hearing they have made no further attempts to interfere with the orderly operation of the company.

As noted previously in the ELECTRIC RAILWAY JOURNAL there was little or no opposition to the fare increases before the State Commission by the different city authorities affected.

Wants Increase on County Lines

The United Railways, St. Louis, Mo., applied to the Public Service Commission of Missouri on Sept. 4 for authority to increase the fares on its St. Louis County and St. Charles lines. It did not ask for a specified amount. It is said that the commission probably can entertain jurisdiction in these applications because Circuit Judge John G. Slate's judgment setting aside the 6-cent fare in the city upon the ground the commission exceeded its authority in granting them is not applicable to the county lines.

Providence Fare Hearing Sept. 16

The Public Utilities Commission of Rhode Island will on Sept. 16 begin its investigation into the new fare schedule filed by the Rhode Island Company, mention of which was made in the ELECTRIC RAILWAY JOURNAL of Sept. 7, page 434. When filed, the new rates were to go into effect Sept. 15, but the commission has ordered them suspended until Nov. 15, pending the investigation.

At the last session of the General Assembly the present zone system was adopted after much controversy, and was ordered into effect. The same law gave to the Utilities Commission authority to modify the system and regulate rates. Under that authority the company believes it has a right to increase fares if it can show necessity.

The present zone system established a 5-cent zone in Providence having a radius of about 2½ miles. Beyond that, zone limits were fixed approximately every 2 miles, and the fare in each of these outside zones was 2 cents for a through passenger, with a minimum of 5 cents as fare in all cases.

Under the new schedule filed the 5-cent zone in Providence is reduced in radius to about 2 miles, and the outside zones, while left practically the same in size, would be 5-cent zones instead of 2-cent zones.

The first point to be settled at the hearings, it is expected, is whether the company can raise fares under the law, and if that is found to be legal, the point will come up concerning the shifting of zone limits, which are named in the law. With the preliminaries out of the way, the procedure throws upon the Rhode Island Company the burden of proving that the new rates are reasonable and just.

2200 Women Workers

This Number of Women in Use on Brooklyn System in All Branches of Service

T. S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, in the recent annual report of the company, commented as follows on the use of women by the company:

"In common with other railroad systems our companies have found it necessary to employ large numbers of women to do work formerly undertaken by men. While some mistakes have been made in selection, such as would naturally occur at this inception of any experiment so radical, it must be said for the great majority of women who have sought these new occupations that they have shown themselves to be efficient, faithful and above reproach.

"There are approximately 576 women now employed as guards on the subway and elevated trains; 252 as conductors on surface lines; 120 in light shop work, and 173 as car cleaners and porters. For a great many years women have been employed as ticket agents, and we have 1150 now acting in that capacity. The employment of women has presented some new problems, particularly with reference to suitable accommodations at depots and shops, and in respect to medical and moral supervision, but these problems are being solved.

"In no class of work in which women are engaged do the duties require unusual physical effort. There is no discrimination against them in the matter of compensation, and the wages paid are considerably in excess of what similar women have heretofore received or been able to get in their previous occupations. To many of them such occupation has been a great boon, for it enables them to support themselves and their families, while husbands or other family wage earners are fighting. Had it not been for the readiness of women to fill these places street railroad service would have been much more seriously handicapped during the past year."

Objects to One-Way Operation

An ordinance has been introduced in the City Council of Portland, Ore., providing for the routing of vehicular and electric railway traffic one way in the district between Taylor, Oak, Front and West Park Streets. The pedestrian traffic will not be regulated by legislation, but educational propaganda will be used in an effort to force the people to observe traffic officers' instructions. F. I. Fuller, vice-president of the Portland Railway, Light & Power Company, maintains that the plan would involve an expenditure of between $40,000 and $50,000 on the part of the company. He also objects to the plan on the ground that the company would lose one-half of track area now in use, and that the additional cars forced on one-way tracks would result in congestion.

Selling Transportation in Dallas

Conductors and motormen operating the cars of the Dallas (Tex.) Railways have orders to stop and wait for persons running to catch a car if such person is within reasonable distance. This order was issued by Richard Meriwether, general manager. Mr. Meriwether said:

"If a car gets under way, the motorman and conductor are not supposed to stop it to take on other passengers, but if either the motorman or the conductor sees a person coming to catch the car and the person is not too far away, it is the duty of the car crew to wait under most conditions. They are to use their best judgment under such circumstances. Sometimes a car will be late and the motorman can not afford to hold his car for the person to reach it. It depends somewhat, too, upon whether there are many cars running on the line. In cases where a person would be obliged to stand and wait ten or twelve minutes for another car to come along the motorman or conductor usually tries to wait for the passenger.

"In the downtown section it is frequently not practicable to hold cars to suit the convenience of persons approaching to board them. The car stops at an intersection, for instance, and takes on the passengers waiting there. The traffic officers turns his sign so as to permit the forward movement of the car. The motorman must move his car onward unless he is actually taking on passengers, for if he does not do so the traffic sign is soon turned the other way and the car is delayed two or three minutes, perhaps Of late we have shortened up schedules on some lines, thus reducing the running time. This has made it necessary to keep the cars moving without unnecessary delays. The public can assist us in having rapid transit in Dallas, if the people make it a point not to lose time in boarding cars and in alighting from them. Persons, as a rule take much more time in getting on cars than is necessary. If they would get on the cars promptly and then promptly move into them and get their seats, making room for those following them, the time lost would be greatly reduced."

I. C. C. Authorizes Increases

Authority to increase fares was granted by the Interstate Commerce Commission on Sept. 11 to a number of suburban and interurban electric railroads, the advances asked for by the roads being reduced in nearly every case. The orders include:

Union Traction Company, Coffeyville, Kan., increase not to exceed 2.6 cents per mile between Parsons and Coffeyville and Nowata, Okla., and intermediate points. The company asked for 3 cents a mile.

Alton, Granite & St. Louis Traction Company, Alton, Ill., increase to 2½ cents per mile plus Mississippi River bridge fare. The company asked for 3 cents a mile.

East St. Louis & Suburban Railway, East St. Louis, Ill., increase of 1 cent in the 10-cent fare between St. Louis and East St. Louis, Ill., and nearby points in Illinois.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., an increase in local fares to 2.6 cents per mile between Kansas City and Lawrence, Kan., and intermediate points. Three cents had been asked for.

The commission is also reported to have authorized the Aurora, Elgin & Chicago Railroad to increase its passenger rates 25 per cent.

Planning Cleveland's Subway System

The Cleveland (Ohio) Rapid Transit Commission on Sept. 10 approved a contract with Barclay Parsons & Klapp, New York, for a survey and preliminary engineering work in preparation for the construction of the proposed underground terminal and subway in that city. One of the questions the firm will be called upon to consider is the direction the growth of the city will take in the future, for the commission desires to plan in the first construction work for the extensions that are to be made later. The engineer will begin then on Oct. 1. The contract price for their services is $25,000.

Owl Car Receipts Fall Off

Figures submitted by the New York (N. Y.) Railways to the Public Service Commission for the First District of New York in announcing that it intended to cease operating surface cars from midnight to 6 o'clock in the morning, show that during the fiscal periods from 1913 to 1918, inclusive, the receipts from sixteen of the lines fell off a total of $1,867,088.

The only line which did not disclose a substantial decrease in returns was the Eighth Street line, where there was an increase of only $1,011 during the six-year period, or an average annual increase of only $168.

This table shows the comparative earnings of the lines in 1913 and 1918, according to the company's figures:

STATEMENT OF RECEIPTS

	1913	1918
Lexington Avenue	$1,704,360	$1,237,569
Madison Avenue	1,923,645	1,869,219
Sixth Avenue	1,113,371	1,015 636
Columbus Avenue	1,714,249	1,275,718
Amsterdam Avenue	730,021	611,944
Seventh Avenue	679,445	578,751
Eighth Avenue	1,556,960	1,315,803
Ninth Avenue	280,303	213,787
145th Street	90,449	79,929
116th Street	286,089	263,706
Eighty-sixth Street	298,939	280,875
Thirty-fourth Street	672,150	571,674
Twenty-third Street	777,879	646,224
Eighth Street	184,912	185,923
Canal Street	6,100	5,035
Grand total	$12,018,882	$10,151,793

The Public Service Commission is busy investigating the affairs of the company and separating those lines where the franchise terms prevent any curtailment of the service from those that are more or less within the company's control.

Basis for Rate Appeals Defined

The Public Service Commission for the First District of New York in an opinion prepared by Commissioner Kracke, has established a basis on which applications for rate increases must be made, and the precise facts that must be proved to the satisfaction of the commission's experts.

Mr. Kracke finds that where a company is earning a fair return on its investment it is not entitled to charge more for its product just because the costs of labor and materials have increased, and that permission to increase the rates must also be denied to those companies which have earned more than a reasonable return in the past and have comfortable balances at their disposal. These balances must first be exhausted before the company will have any standing as a suppliant for financial relief.

In his opinion Mr. Kracke says in effect that any relief granted must be within lawful and reasonable limits and must be because of conditions caused by the war which demand rate readjustments "as a sheer matter of conserving and continuing absolutely essential public services of heat, light, transportation, power, and communication." He says that when a change in the rate is imperative "it is important that the means be available of making the readjustment as expeditiously and economically as the facts warrant without in any way binding the companies, the consumers, or the commission as to the action which will be taken when conditions are again normal."

Entertainment for Tacoma Employees

The semi-annual dance and revue of the employees of the Tacoma Railway & Power Company was held at the Masonic Temple, Tacoma, Wash., on the evening of Aug. 29. The committee in charge of the dance and revue was composed of representatives of the transportation department and the power and equipment department. After the presentation of the revue, ice cream, cake and punch were served.

The dances were listed on the program as follows: Puyallup Hop, McKinley Flop, Traction Blues, Skip-Stop Trippers, One-Man Wiggle, Block Light Meet, Seven-Cent Waltz, Fern Hill Jazz, Spanaway Glide, Port Defiance Bumps, Tide-Flats Roughs, and the "K" Street Squeeze. There was plenty of good music for both the dance and the revue.

There is talk of having another entertainment of a similar nature. The next movement, however, will probably be that of getting an orchestra together, for in looking for talent for the revue it was found that there are enough talented employees in the service of the company to make a fine orchestra.

Many officers of the company were in attendance.

New Jersey Case Concluded

The hearing on the renewed application of the Public Service Railway, Newark, N. J., to the Board of Public Utility Commissioners of that city for permission to charge a 7-cent fare was concluded at a session in Newark on Sept. 5. The railway was represented by Thomas N. McCarter, president; E. W. Wakelee, vice-president; Frank Bergen, counsel, and L. H. D. Gilmour, solicitor. Mr. Wakelee summed up the company's plea for additional revenue. Chief Counsel Marshall Van Winkle, who has represented the League of Municipalities opposing the fare increase, was absent from the hearing. George L. Record was heard in opposition, however, but there seemed to be some question about his status. Finally Mayor Gillen of Newark declared that Mr. Record represented that city. Mr. Record said that he had no new evidence to offer because the case of the municipalities had been presented in the earlier proceedings and the League of Municipalities decided to stand by the testimony produced previously. The commission took the case under advisement. As a result of its original plea to the commission for relief, the company was allowed to charge 1 cent for each transfer.

New Buffalo-Niagara Falls Tariff

The new passenger fare tariffs just filed with the Public Service Commission for the Second District, containing increased fares between points on the Buffalo and Niagara Falls and the Buffalo and Lockport divisions and the company's high-speed line, are proposed as effective on Sept. 28. The increases proposed follow increased rates which went into effect on Aug. 22, when the one-way fares between Buffalo and Niagara Falls were increased from 35 to 50 cents and between Niagara Falls and Lockport from 35 to 50 cents. There were like increases between Buffalo and Lockport and between Lockport and Niagara Falls. On the Buffalo and Lockport division one-way cash fares between all points where the present fares are in excess of 5 cents are increased, the increases varying in amounts from 5 cents to 30 cents, and ticket fares between Buffalo and Lockport, Buffalo and Niagara Falls, and Lockport and Niagara Falls are increased 10 cents. The prices for monthly commutation ticket books between Lockport and Buffalo, and Lockport and Niagara Falls are increased from $8 to $10, between Lockport and Tonawanda from $6.90 to $9, and between Lockport and Paynes Avenue Junction from $5.50 to $7.50. The prices of school commutation ticket books are increased between Buffalo and Lockport from $6 to $7.50, and between Buffalo and North Tonawanda from $3.75 to $4.75, and between Pendleton Center and Lockport from $3.25 to $4.25. These are only a few of the changes, but they indicate the general trend of the tariff.

Transportation News Notes

Wants Six Cents in Topeka.—The Topeka (Kan.) Railway has filed an application with the Public Utilities Commission asking permission to establish a 6-cent fare in Topeka and Oakland.

Providence Service Cut.—Changes in the running time and terminals of certain lines and discontinuance of some service have been announced by the Rhode Island Company, Providence, R. I., in the hope of effecting additional operating economies.

Seven Cents Asked in Atchison.—The Atchison Railway, Light & Power Company, Atchison, Kan., has applied to the Public Utilities Commission for a 7-cent passenger fare in that city, and an increase of 20 per cent in its light and power schedule in Atchison.

Newark Would Abolish Owls.—The Public Service Railway, Newark, N.J., is considering the advisability of discontinuing all traffic in that city between midnight and 6 a. m. except on such lines as are used by the employees of industrial plants where war work is in progress.

Houston Fare Plea Filed.—The Houston (Tex.) Electric Company has an application pending before the City Council for a 7-cent adult fare and for a 3½-cent fare for school children. The matter of increased fares for this company was referred to in the issue of this paper for Sept. 7.

Wants Freight Increase.—The Elgin & Belvidere Electric Railway, Elgin, Ill., has petitioned the Public Utilities Commission of Illinois for an increase of 25 per cent in freight rates and an increase in express rates to conform with those now charged by the government-controlled express companies.

Harrisburg Companies File New Tariffs.—The Harrisburg (Pa.) Railways has filed with the Public Service Commission of Pennsylvania a tariff calling for a 6-cent fare from Oct. 1. The Valley Railways, operating in Lemoyne across the river from Harrisburg, has filed a tariff with the commission calling for a 7-cent fare from Oct. 1.

Fort Wayne Wants Six Cents.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has petitioned the Public Service Commission of Indiana for permission to charge a straight fare of 6 cents in Fort Wayne and 3 cents a mile on the interurban lines. A straight 5-cent fare went into effect in Fort Wayne some time ago.

New Tariff for Connecticut Valley Line.—The Connecticut Valley Street Railway, Greenfield, Mass., has filed a tariff with the Public Service Commission effective on Nov. 4 proposing to increase the rate of fare. The system has been divided into zones each approximately 1 mile in length, the fare to be 3 cents in each zone with a minimum charge of 6 cents.

Five Cents Straight in Ottawa.—The Ottawa (Ont.) Electric Railway has raised its passenger tariff by abolishing the $1 books of tickets, and substituting ticket strips containing five instead of six tickets for 25 cents, thus establishing a straight 5-cent fare. No other change has been made in the tariff, the workingmen's, school children's and Sunday tickets remaining at the usual rates.

Los Angeles Suburban Fare Increase.—The Railroad Commission of California on Sept. 4 granted an increase in passenger rates to the Pacific Electric Railway, Los Angeles, which is expected by the commission to produce approximately 20 per cent increase in the gross revenues of the company. The increase is applicable to lines outside of Los Angeles only, fares within the city remaining at 5 cents. The company asked 7 cents in the city.

No Higher Fares as Yet for Boston.—Contrary to press reports, there is no prospect of any immediate establishment of fares in excess of the present 7-cent unit on the Boston Elevated Railway. The trustees are studying methods of increasing revenue, including possible zone plans, but until the War Labor Board issues its finding in the company's wage case, it will be difficult to determine the next step in fare studies. During the past month the 7-cent fare has increased revenue by about 23 per cent.

Commission Approves Denver Increase.—The Public Utility Commission of Colorado on Sept. 12 granted the petition of the Denver Tramway for emergency relief. This will render effective on Sunday, Sept. 15, on all city lines a 6-cent fare with no reduction in rates except a 3-cent fare for children. The City Council previously passed the 6-cent fare ordinance, thus establishing in Denver one of the first instances in the country, if not the first, where both the municipality and the State have joined in giving concurrent relief.

Abandonment of Owls Frustrated.—The plan of John Candler Cobb, Boston, Mass., to suspend the operation of all of the surface lines operated by the New York (N. Y.) Railways from midnight to 6 o'clock in the morning was overruled on Sept. 10 by the Public Service Commission for the First District of New York which adopted an order making it impossible for the company to curtail the present service. Mr. Cobb represents the income bondholders of the company. He is a member of the board of directors of the company.

Question of Authority at Montgomery.—Holding that it had jurisdiction over regulating fares in all municipalities of Alabama, the State Public Service Commission, in session on Sept. 4 set aside the 7-cent car fares granted the Montgomery Light & Traction Company on Sept. 3, by the City Commission. The company, already engaged in collecting the increased fares, when notified that each collection constituted an illegal act, discontinued the practice. The company had appealed to the commission for a 10-cent fare on its lines extending beyond the corporate limits.

Philadelphia Fare Policy Announced.—The Philadelphia Rapid Transit Company has announced that, should the Public Service Commission fail to ratify the pending contract between the city and the company for the operation of the city-built lines, it will, prior to Jan. 1, 1919, request the commission to establish a zone system of fares in Philadelphia. It is proposed to make the base fare 5 cents with an additional charge for passengers outside of the original zone. Notice to this effect was received by the commission on Sept. 10 in a letter from Thomas E. Mitten, president of the company.

"The Trollier" Discontinued.—The Rhode Island Company, Providence, R. I., announces the discontinuance of *The Trollier*, a weekly publication issued in the interest of the company and its employees. In the issue of the paper for Aug. 31 the company says: "For the last few weeks the serious financial condition of the Rhode Island Company has become more and more acute, but we have tried to hold all departments intact. After careful consideration and much regret the directors voted to suspend temporarily, we hope, the official organ that has done so much to bring us all into closer communion."

Yonkers Fare Plea Entered.—Leslie Sutherland, vice-president and general manager of the Yonkers (N. Y.) Railroad, appeared before the Yonkers Common Council on Sept. 9 to support a petition that the company's franchise be suspended for the duration of the war and one year afterward. Mr. Sutherland, who is also second vice-president of the Third Avenue Railway, New York City, would not state what amount of increase was desired. He did say, however, that unless the company was granted an increase it would probably have to suspend. The Council referred the petition to a sub-committee which will take the matter under advisement. This committee will probably report within a few days.

Wants Three Cents a Mile.—George Bullock, as receiver of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., on Sept. 7 filed an amended petition with the Public Service Commission for the Second District, asking authority to charge passengers at the rate of 3 cents a mile from the State line to the city of Buffalo, instead of 2¾ cents a mile. The petition says the employees have received a wage increase of approximately $75,000 in New York State and are demanding a further increase, facts regarding which were presented to Commissioner Barhite at a hearing in Buffalo on Sept. 4. There will be another hearing before the commissioner at Buffalo on Sept. 16.

More One-Man Cars for Seattle.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., will install one-man car service on two new routes, one from Columbia Street over the West Queen Anne and Kinnear lines to Second Avenue West, and the other on the Broadway line, from Union to Prospect Street, duplication of the Capitol Hill service now being given. The one-man cars will operate throughout the entire day, and will be in addition to the present cars. The company believes the Queen Anne Hill patrons will patronize the small cars in the rush hours, thus relieving the present overloading of the West Queen Anne cars, which cannot be increased in number, because of the counterweight limitations.

Additional Subway Service Ordered.—The inquiry which the Public Service Commission for the First District of New York has been making into the condition and operation of trains by the Interborough Rapid Transit Company resulted on Sept. 7 in an order increasing the service both as to the number of trains and the number of cars. Beginning Sept. 15, the company is directed to operate ten-car express trains on a two-minute headway during the rush hours on the west and east side subways, and six-car local trains on a three-minute headway in the same periods. To the end that the commission may know that the order is obeyed and maintained without interruption, it directs the company to file schedules covering service at all hours, exclusive of Sundays and legal holidays.

Oakland Company to Accept Bus Transfers.—The De Luxe Transportation Company has arranged with the Oakland (Cal.) Traction Company to deliver all passengers at Hayward to the electric system for transportation to San Francisco or East Bay cities. The bus service will also handle freight, baggage, express and mail. The De Luxe Company is to operate buses from San José to the Alameda County line, at which point passengers are to be transferred to the street cars. The schedule is every forty minutes during the rush hours and at hour intervals during the remainder of the day. The through rate (47 miles) is to be $1.10, and 85 cents is to be charged between San José and Hayward (31 miles). The passenger buses are to be lighted and heated electrically. Each will have a seating capacity for twenty-five passengers.

Six Cents for Fresno.—The Railroad Commission of California has authorized the Fresno (Cal.) Traction Company to increase its 5-cent fares to 6 cents, and its commutation fares 10 per cent. The company has operated with a deficit each year for the last four years. The company estimates a deficit this year, if the present rates were maintained, of $85,000. In the commission's judgment the public would favor any increase in rates, rather than a radical reduction in the service rendered. The relief sought by the company does not rest upon any demands for return upon invested capital, but only for sufficient revenue to meet operating expenses and fixed charges. According to the commission, this situation represents a war necessity. Any added revenue obtained from the increase in rates will be absorbed in increased compensation positively necessary to employees and for the purchase of materials.

Conference on Reading Valuation.—Another hearing was held in Reading, Pa., on Aug. 29 before the Public Service Commission, in the matter of increased fares which high operating costs have made necessary on the city and suburban lines of the Reading Transit & Light Company in Reading, Norristown and Lebanon. Contentions having been raised by the protestants, over the valuation which the company submitted at the first hearing some months ago, the commission ordered that an engineer representing the railway and another representing the protestants confer with one of the commission's engineers, with a view to having a valuation agreed upon, that can be used as a basis for the final disposition of the fare cases. There being nothing further to submit from the protestants, this ended the hearing. Another will be called as soon as the engineers have a report to submit.

Fares Fixed by Ordinance Must Stand.—A decision was handed down on Sept. 10 by Judge Chatfield in the United States District Court in Brooklyn in the case of the Gas & Electric Surety Company against the Manhattan & Queens Traction Corporation, New York City, in which it was held that it is not the province of the court to alter rates fixed by contract between a city administration and a private corporation, but a matter for legislation. The suit, brought in the Federal court because the defendant corporation is now in the hands of a receiver, is based on a plea for increase to a 7-cent fare and increases of wages of employees. The Judge said: "The receiver of a property can operate under the franchise or contract, but cannot disregard the essential limitations showing of what the property consists. Beyond the limits created by the franchise or contract the court has not the power to fix rates other than the city has already fixed." The case has been pending only a short time.

Legal Notes

FEDERAL COURTS—*Owner of Property Injured by Railway Construction Must Show Actual, Not Relative, Loss.*

The owner of realty injured by the construction and operation of an elevated railroad was not deprived of his property without due process of law in violation of the Fourteenth Amendment because benefits resulting from the increased travel were considered in determining whether the premises had been damaged, though other lands in the neighborhood were similarly benefited, for the right guaranteed is merely that the owner shall not be deprived of the market value of his property under a rule of law making it impossible for him to obtain just compensation, and there is no guaranty that he shall derive a positive pecuniary advantage from a public work whenever a neighbor does. (McCoy et al. *vs.* Union Elevated Railway, 38 Supreme Court Rep., 504.)

CALIFORNIA—*Penalty for Frivolous Appeal.*

Where the evidence in the opinion of the court showed that the defendant was extremely negligent and that the person killed was not negligent, an appeal on the ground that deceased was negligent as a matter of law and that defendant was entitled to a directed verdict, was frivolous, and a penalty of $100 was added to the damages. (Levings et al. *vs.* Pacific Electric Railway, 173 Pacific Rep., 87.)

INDIANA—*The Right of Way of Funeral Processions.*

In an action for damages in a collision between a street car and a hearse, where the company admitted that it was customary to give funeral processions the right of way, an instruction that although the driver had an equal right of way with the car, it was his duty on seeing the car to drive off the tracks, was improper, as ignoring the custom. (Beck *vs.* Indianapolis Traction & Terminal Company, 119 Northeastern Rep., 528.)

KENTUCKY—*Company Not Under Obligation to Complete Line.*

The making and filing of articles of incorporation for the construction of a railroad, which contain no covenant that the railroad will be constructed, do not impose any duty upon the corporation to construct the proposed road nor to complete its construction after it was commenced.

An electric line proposed to be constructed between two towns and completed only part of the distance, was not a street railway within Const. Art. 163, 164, requiring a franchise of not more than twenty years' duration to be acquired, and the fact that by organizing as an interurban line the company escaped the franchise cost of street railways did not obligate it to complete the line to the second city. (Bentler *vs.* Cincinnati, Covington & Erlanger Railway, 203 Southwestern Rep., 199.)

LOUISIANA—*Contributory Negligence to Stand on Platform of High-Speed Interurban Car.*

It is contributory negligence for a passenger on a fast-moving suburban train, when it was being operated outside of a municipality, to stand on the platform, particularly after being warned not to do so, and he cannot recover damages for injuries resulting to him from such negligence, although there was mutual negligence on the part of the employees of the railway company. (Louviere *vs.* Southwestern Traction & Power Company, 77 Southern Rep., 293.)

MAINE—*Who Are "Passengers"?*

A person who was injured by the opening of the front door of a pay-as-you-enter street car while passing by such door to enter the car at the rear door, held not a passenger at the time of the injury. (Murray *vs.* Cumberland County Power & Light Company, 103 Atlantic Rep., 66.)

MASSACHUSETTS—*A Collision with Unregistered Automobile.*

Less care is demanded of a motorman to avoid a collision with an unregistered automobile than with one which has complied with the law. To make the company liable he must inflict the injury intentionally or be so utterly indifferent to the rights of others that he acts as if such rights did not exist. Gross negligence alone will not suffice. (Wentzell *vs.* Boston Elevated Ry., 119 Northeastern Rep., 652.)

MICHIGAN—*City Order for Relocation of Street Car Tracks Should Be Obeyed.*

A city resolution ordering a change of location of street car tracks is not invalid because where the tracks cross a railroad they cannot be moved under the existing law without the consent and order of the State Railroad Commission, since it will not be assumed the Railroad Commission will withhold its consent, and, if it should, its failure to consent would be a good defense to an attempt to enforce the order. (City of Owosso *vs.* Michigan United Railways, et al., 167 Northwestern Rep., 920.)

MICHIGAN — *Workmen's Compensation Act—Definition of Injury "Arising Out of Employment."*

To entitle a claimant to compensation for an injury arising out of his employment it must be shown that the causative danger was peculiar to the work and not common to the neighborhood, and that it was incident to the character of the business and not independent of the relation of master and servant, and, while it need not have been foreseen or expected, it must, after the event, appear to have had its origin in a risk connected with the employment and to have flowed from that source as a rational consequence.

In a proceeding by a common laborer employed in the street track-laying department of a street railway for personal injury when a delivery wagon struck the boom of a concrete breaker and moved it toward him, a finding of the Industrial Accident Board, made the final arbiters of questions of fact, that he was sitting on the curb during a lull in the work, but on duty, when struck was sufficient, if warranted, to support an award, though against the weight of the evidence. Malone *vs.* Detroit United Railway, 167 Northwestern Rep., 996.)

New Publications

Grinding Wheels

No. 13 in the series of "Safe Practices" pamphlets issued by the National Safety Council, Chicago, Ill. Price, 10 cents.

Covers inspection, storage, mounting and safeguarding of abrasive wheels.

Measuring the Temperature of Gases in Boiler Settings

By Henry Kreisinger and J. F. Barkley. Bulletin No. 145 of the Bureau of Mines, Department of the Interior, Washington, D. C., seventy-two pages, paper. One copy free; extra copies, 15 cents each.

This bulletin contains the results of an experimental study of the subject, together with a description of the methods and apparatus used in the tests.

A Convenient Multiple-Unit Calorimeter Installation

By J. D. Davis and E. L. Wallace. This is a reprint of Technical Paper No. 91 of the United States Bureau of Mines, Washington, D. C., first printed last November; 48 pages. One copy free; extra copies 15 cents each.

This bulletin gives full information regarding the calorimetry practice of the Bureau of Mines and should be of value to anyone who is concerned with measurements of the heating value of fuels.

Scope and Application of National Electrical Safety Code

Circular No. 72 of the Bureau of Standards, United States Department of Commerce. 84 pages. Copies may be secured at 20 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

This new publication on the safety code has been prepared to bring the subject up to date, and it contains supplementary information based upon actual experience with the code. An interesting feature is a list of 100 typical electrical accidents indicating the need for a safety code. The circular should be read at once by all electric railway men who are concerned with the application of the code itself.

Personal Mention

C. H. Whitesell has been appointed master mechanic of the Wheeling (W. Va.) Traction Company. Mr. Whitesell has been in the employ of the company since 1901, during which time he has served in the capacities of carpenter, carpenter foreman, general carhouse foreman and inspector.

Walter J. Hodgkins, former manager of the construction department for the Ashland Light, Power & Street Railway Company, Ashland, Wis., has been made manager for the entire works, following the resignation of F. R. Winders. Mr. Hodgkins will have charge of all the work of the company, which includes interests in Ironwood, Bessemer, Wakefield, Hurley and Washburn.

Walter Hedley, son of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., and the New York Railways, has been decorated with the Croix de Guerre. He was one of four members of United States Ambulance Unit No. 592 to be so honored. The citation of the unit for bravery and gallantry under fire was made after its members had completed their first year of service in practically every sector on the western front from Ypres to Lorraine.

Pitt F. Drew has been elected president of the Middlesex & Boston Street Railway, Newtownville, Mass., to succeed James L. Richards, resigned. Mr. Drew was born in Lancaster, N. H., on Aug. 27, 1875, and was educated at Phillips Andover Academy, Dartmouth College and Harvard Law School. He has practiced law in Boston since 1902. He is the son of Irving W. Drew, recently appointed United States Senator from New Hampshire, and brother-in-law of Edward K. Hall, vice-president of the Electric Bond & Share Company. He has no other corporate affiliations of general interest.

Guy E. Tripp, formerly colonel in the United States army and head of the production division, has been made brigadier general in the United States army, and placed in offices having charge of the production of ordnance material in their respective sections of the country. The district chiefs will report direct to General Tripp, who is succeeded as head of the production division by Col. C. C. Jamieson. Previous to his connection with the ordnance department, General Tripp was chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, with headquarters in New York.

John A. Dewhurst has recently resigned from the Twin City Rapid Transit Company, Minneapolis, Minn., to become connected with Day & Zimmerman, Inc., engineers, Philadelphia, Pa. Mr. Dewhurst was with the Twin City Rapid Transit Company three years. Before that he was with the railway and traction engineering department of the General Electric Company. While at Minneapolis he was engaged on transportation problems, having had charge of the schedule department part of the time and being assistant to the general superintendent during the rest of his service with that company.

T. F. Johnson, superintendent of transmission and distribution of the Georgia Railway & Power Company, Atlanta, Ga., has been appointed assistant general superintendent of the electrical department. Mr. Johnson has been with the company eight years. He was graduated from Georgia Tech. in 1908, and in 1910 took his engineering degree, joining the company that fall. He started in rolling a wheelbarrow at the Fulton plant, went to Morgan Falls, worked with the Northern Construction Company on the big Tallulah power development and rejoined the Railway & Power Company as head of the transmission and distribution department. The position of assistant general superintendent has just been created.

James L. Richards has resigned from the presidency of the Middlesex & Boston Street Railway, Newtownville, Mass. Mr. Richards has been at the head of the property for about ten years, succeeding Adams D. Claflin. He is president of the Boston Consolidated Gas Company and until the taking over of the Boston Elevated Railway by public trustees was a member of the executive committee of the board of directors of the Boston Elevated Railway. He has long been identified with the movement for securing higher fares on street railways in Massachusetts and was one of the first financial executives in the East to recognize the abilities of M. C. Brush, now president of the Boston Elevated Railway and formerly associated with Mr. Richards in the management of the Middlesex & Boston road.

Richard H. Wheeler has recently been appointed traffic manager of the Hercules Powder Company at the Nitro plant, Nitro, W. Va. Mr. Wheeler was assistant designing engineer of the electric locomotive department of the General Electric Company in 1911-1912. From 1912 to 1915 he was assistant electrical engineer of the electrification of the Mount Royal tunnel and terminal project of the Canadian Northern Railway at Montreal From 1915 to 1917 he was assistant engineer of the Shawinigan Water & Power Company at Montreal. From 1917 to 1918 he was designing engineer with Ford, Bacon & Davis, New York, and from February, 1918, up to the time of his appointment to the Hercules Powder Company he was assistant manager of the powder apparatus department for the Thompson-Starrett Company, construction engineers, building the United States government explosive plant "C."

Obituary

Edward E. Potter, superintendent of transportation of the Houston (Tex.) Electric Company, died suddenly at Houston on the evening of Sept. 7. Mr. Potter had been connected with Stone & Webster properties in various parts of the country for many years. His former home was at New Bedford, Mass., where his widow and one son now reside. He was formerly general manager of the Seattle (Wash.) Electric Company. Later he was transferred to the home office of Stone & Webster at Boston.

Robert C. Green, superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., and the Easton Transit Company, died suddenly on Aug. 31 after returning home from the theater with his wife where they had been members of a party which included President Harrison R. Fehr of the company and Mrs. Fehr. Mr. Green was born in Memphis, Tenn., thirty-four years ago. He received his preliminary training under the tutelage of his father, Alfred C. Green, of the Galena Signal Oil Company, when he was master mechanic of the shops of the Rochester (N. Y.) Railway. Robert Green attended a technical school in Rochester, from which he was graduated a mechanical engineer. He was employed for some time by the Public Service Corporation, Newark, N. J., and later by the Metropolitan Street Railway, New York, N. Y. In September, 1912, he entered the employ of the Easton Transit Company, and eighteen months ago he was given full charge of equipment on all lines of the Lehigh Valley Transit Company, which position covered the superintendency of the shops at Allentown, Easton, Souderton, Slatington and other points on the system. The latest type of equipment used by the Lehigh Valley Transit Company is the design of Mr. Green. He also designed the all-steel double-truck, center-entrance cars, known as No. 900, and the standard passenger car of the system. The snowplows and service cars are also of his design. He was generally recognized as possessing exceptional ability in the solution of mechanical engineering problems, and his death closes a career which promised to have been a brilliant one had he lived. Mr. Green is survived by his widow and twin daughters.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Recent Incorporations

***Indian Creek & Northern Railway, Fairmont, W. Va.**—Incorporated to construct a line from Lowesville to Blacksville. Capital stock, $50,000. Incorporators: J. W. Devison and C. A. Philippi, Granttown and S. D. Brady, James Close and James A. Meredith, Fairmont.

Franchises

Newark, N. J.—The State Board of Public Utility Commissioners has approved the application of the Public Service Railway for ordinances of the Newark Board of Street and Water Commissioners adopted May 23 granting permission to the company to construct a new line in Newark called the Port Newark extension and also an extension connecting the tracks of the company in Chestnut Street, Newark, through Gotthardt Street to Hamburg Place, a distance of less than a mile and a half. Each franchise is to run for fifty years. The Port Newark line is an extension from the tracks in Hamburg Place east of Avenue L and through Hamburg Place and Avenue R over the bridge of the Lehigh Valley Railroad Company and the Pennsylvania Railroad between Astor and Murray Streets, Newark. The plan includes a bridge over the Central Railroad crossing with approaches. The extension is to constitute a separate fare zone of 5 cents for each person unless the general rate of fare is increased beyond 5 cents. It is to be operated under the agreement of the Public Service Railway entered into with the United States Shipping Board Emergency Fleet Corporation, March 7, 1918.

Track and Roadway

***Los Angeles, Cal.**—Plans have been completed by the city of Los Angeles for the construction of a new electric railway system between Redondo Beach and Torrance, about 4 miles, to provide adequate transportation facilities for workers employed in the various shipbuilding and war plants in the vicinity of San Pedro. The work is estimated to cost about $100,000.

San Francisco - Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has filed with the Railroad Commission of California an application for authority to buy from the Emergency Transportation Company $10,100 capital stock of the latter company. The payment for the stock is to be in materials and labor furnished to the Emergency Transportation Company in the construction of a single-track railroad on Chestnut Street from Eighth to First Streets, with station spur tracks at the foot of Chestnut Street. The San Francisco-Oakland Terminal Railways intends, with the consent of the commission, to lease the complete railroad from the Emergency Transportation Company.

Winnipeg (Man.) Electric Railway.—An extension will be built by this company on Sargent Avenue.

Bay State Street Railway, Boston, Mass.—According to a finding of the Public Service Commission of Massachusetts, the Bay State Street Railway is not required at present to build an extension costing $35,000 in the Ayers City district of Lowell, Mass. Citizens of Lowell petitioned the board to order the company to build the extension, a grant of location having been made in 1901 with the proviso that the construction should be completed within two years.

Kansas City (Mo.) Railways.—A loop will be constructed by the Kansas City Railways on Monroe Avenue between Nicholson and Garner Avenues between the Missouri Pacific and Kansas City Southern shops, and a "Y" will be built at the west terminus at Thirteenth Street and Central Avenue, Kansas City, Kan.

Southwest Missouri Railroad, Webb City, Mo.—Work will be begun at once by the Southwest Missouri Railroad on the construction of an extension of its line on Main Street south from the present terminus to connect with the Joplin-Picher line.

Cincinnati, Ohio.—Director of Street Railroads Culkins is working out a plan for connecting the east end of the city with Cumminsville by establishing a cross-town line through Hyde Park, Oakley, Norwood and Bond Hill.

Guelph (Ont.) Radial Railway.—This company is constructing 3000 ft. of track on Garden Street, Guelph.

Toronto (Ont.) Suburban Railway.—The Toronto Suburban Railway has been granted an extension of time until Nov. 30 within which to construct, equip and put in operation its extension on Davenport Road east of Bathurst Street to the northern limits of the city.

Rio Grande Valley Traction Company, El Paso, Tex.—It is reported that extensions to its system are being contemplated by the Rio Grande Valley Traction Company.

Shops and Buildings

Public Service Railway, Newark, N.J.—An addition will be built by the Public Service Railway to its workshops at Newton and States Avenues, Camden.

Richmond Light & Railroad Company, New York, N. Y.—The Public Service Commission for the First District of New York has ordered the Richmond Light & Railroad Company to make extensive improvements in its shops, etc., and overhaul its rolling stock, to provide for increased operation.

Cleveland, Ohio.—Plans have been revived for the construction of a new combined steam and interurban passenger station to face the Public Square at Cleveland, Ohio. The Cleveland Union Terminals Company was recently incorporated with a capital stock of $10,000 by John L. Cannon and Charles W. Stage, attorneys.

Power Houses and Substations

New York, New Haven & Hartford Railroad, New Haven, Conn.—Approximately 18 acres of land have been acquired by the New York, New Haven & Hartford Railroad along the west bank of the Mianus River to provide additional water supply for its power plant at Cos Cob.

Syracuse & Suburban Railroad, Syracuse, N. Y.—It is reported that in connection with the reorganization of the Syracuse & Suburban Railroad it is planned to make extensive improvements in the power plant and system.

Bartlesville (Okla.) Interurban Railway.—In order to meet the increasing demands on the electric plant of the Bartlesville Interurban Railway, new generating, condensing and boiler equipment is now being added which will be in service early in the fall. The new equipment consists of a 1250 kw Westinghouse turbine and LeBlanc jet condenser, a 3600 g.p.m. spray pond and a 300 hp. Heine boiler. A reserve supply of fuel oil to protect against gas shortage this winter will be made available by the installation of a 3000 bbl steel tank. John Strom, Joplin, Mo. is in charge of new construction work.

Monongahela Valley Traction Company, Fairmont, W. Va.—Plans are being made by the Monongahela Valley Traction Company to construct a gas producer plant and lay 8 miles of 5- and 6-in. pipe line.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS
FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

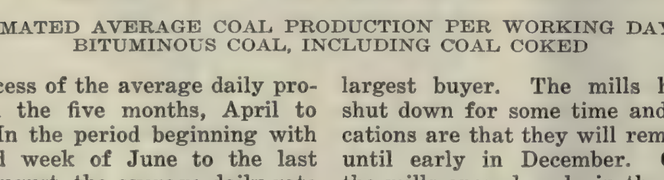
Coal Production Up to Last Week's Record

Output of Mines Must Be Maintained At High Level in Order to Keep up to Schedule

The output of bituminous coal in the United States during the week ended Aug. 31 was approximately the same as the week preceding, according to the regular weekly report of the Geological Survey. Estimates place production during this week at 12,642,000 net tons as against 12,620,000 net tons during the week of Aug. 24 and 11,056,000 net tons during the corresponding week of 1917.

The average production per working day for week ended Aug. 31 is estimated at 2,107,000 net tons, an increase over the corresponding week of last year of 14 per cent and over the average daily requirements for the coal year of 4.7 per cent. The schedule of the Fuel Administration, however, calls for an increased rate of production during the six months beginning with April, and production in the first five of these six months has been nearly 13,000,000 tons below this figure. To overcome this apparent shortage it will be necessary to maintain the average daily rate of production during the seven months remaining in the coal year at 2,037,000 net tons or 2.9 per cent in excess of the average daily production in the five months, April to August. In the period beginning with the second week of June to the last week of August, the average daily rate of production has been approximately 2,061,000 net tons, compared with an average daily rate in the period from the first of April to the first of June of 1,864,000 net tons. It is thus evident that only by maintaining production at the level of the last three months through the good weather portion of the coming seven months of the coal year, will the estimated requirements be met. These figures of estimated requirements are based upon 628,000,000 tons per year for the year, divided between fifty-two weeks of six working days each, with no allowance for national holidays.

Production of anthracite in the United States during week ended Aug. 31 is estimated at 2,259,715 net tons, an increase over the week preceding of 125,716 net tons or 5.9 per cent, and over the corresponding week of last year of 268,228 net tons or 13.5 per cent. The daily average during the current week is estimated at 376,619 net tons as against 338,677 during the coal year to date, and as against 329,923 net tons during the coal year of 1917. The total production for the coal year to date is estimated at 44,028,000 net tons as against 42,890,000 or an increase of 2.7 per cent.



ESTIMATED AVERAGE COAL PRODUCTION PER WORKING DAY OF BITUMINOUS COAL, INCLUDING COAL COKED

Car Window Glass Higher

Supply Short and Still Falling Off —Mills May Not Open Before December

By reducing the discounts on car window glass from 80 per cent to 77 per cent on quality A first three brackets, single strength and from 82 and 3 per cent to 79 per cent on AA quality, double thickness, the manufacturers have succeeded in raising prices. The supply of glass is becoming shorter each day with the government as the largest buyer. The mills have been shut down for some time and the indications are that they will remain closed until early in December. Ordinarily the mills opened early in the fall when the furnaces had all been fixed and the hot weather over.

In order to obtain a supply for the winter street railways may find it best to anticipate their needs. There are no reasons why the price should be lower but rather some of the recent activities in the market might be forerunners of still higher prices. Besides, the supply is so low that it might be found advantageous not to have to rely on any outside stocks.

Tungsten Lamps To Replace Carbons and Gems

Fuel Administration Announces Plan for Conservation—Little or No Effect on Railway Market

The Fuel Administration has announced the adoption, effective on Sept. 15, of a plan contemplating the gradual elimination of the carbon and gem lamps and the substitution therefor of the tungsten lamp. Inasmuch, however, as the electric railways are now almost universally using the tungsten lamp the plan will not affect their supply except perhaps to increase it.

The supply of lamps last winter became very low in certain parts of the country, and while a generally very good condition at present, there is a feeling that another shortage may develop this winter. The release of factory space and of glass should help to minimize any shortage.

Changes in Brill Organization in St. Louis

A change in the personnel of the American Car Company of St. Louis, one of the subsidiary companies of The J. G. Brill Company, occurred on Sept. 1, when George H. Tontrup, for many years general manager, and E. L. Bronenkamp, Southern sales agent, severed their connection with the Brill organization to enter into an enterprise in St. Louis mentioned in another column. Ford A. Richards, for several years the representative of the Brill organization on the Pacific Coast, has been made general sales manager, and Wirt L. Haymond, for many years associated with the business department of the American Car Company, has been made assistant sales manager.

Program for Semi-Annual Meeting of A. G. M. A.

An interesting program is being arranged for the semi-annual meeting of the American Gear Manufacturer's Association, which will be held at the Onondaga Hotel, Syracuse, New York, Sept. 19, 20 and 21.

A portion of the program has been announced as follows:

"Priority," by Charles A. Otis, of the Priority Committee.

"What Is the Possibility of Women Becoming a Permanent Factor in the Gear Industry?" by W. H. Diefendorf.

"Trade Acceptances," by C. E. Crofoot.

"The Outlook of the Steel Supply," by C. E. Stuart, secretary-treasurer Central Steel Company, Massillon, Ohio.

Conditions Right for Purchase of Shop Tools

Although Prices Are High, the Savings Effected Show a Quick Profit on Investment

A survey of repair-shop conditions on electric railways indicates that there never was a time when the discriminating purchase and supervised application of high-class tools would pay a better return upon the cost of such equipment than now. The price of material and supplies under war conditions is so high that waste of stock must be cut to the minimum, and anything which increases production reduces the amount of material held in reserve at the expense of the country's resources at large. The present and prospective cost of labor for some time to come put a premium on time-saving methods, and a good deal of spasmodic buying in the tool market has lately been due to this cause.

It is true that the shipyards and munitions plants have consumed tools in enormous quantities and that as long as the war lasts this condition may be expected to continue. In many cases electric railways have postponed machine tool purchases on account of revenue being below that required to meet the fair cost of service, including maintenance on a liberal program. Deliveries, also, have been seriously affected by the demands of the plants engaged in immediate war service. The cost of a machine tool installation capable of working a substantial change for the better in repair-shop service is not very great in proportion to the benefits at once made possible.

Prices are high, and many managers hesitate to tie up money in tools which cost from 50 to 100 per cent more than before the war, thinking mainly of the perpetual fixed charges thus set in motion. If the service possible by such tools is viewed from the standpoint of production, however, the investment cost shrinks in importance. Where it can be shown that a machine tool will pay for itself in a year or two after installation and perhaps show a handsome profit besides, it is a conservation step to secure it if the work of some munitions plant or other gilt-edged priority concern will not thereby suffer. Without the service of the electric railway, the work of many a munition plant would go lame indeed, and there is reason to believe that tools which can be shown to be essential to better transportation service can be procured if the railway manager and purchasing agent go about the matter promptly with the government authorities.

Master mechanics of railway companies do not need to be told that there is a field of almost unparalleled opportunity in their jurisdictions for the increase of shop efficiency through improvements in tool service. It is significant that a good deal of machinery has been going into railway shops in the past few years despite the handicaps of inadequate revenue. The market has not been developed to anything like its possibilities, however. This is partly due to the absorption of the machine tool builders in filling orders outside the electric railway field, and is also due in part to a feeling that until enough money is available to build new and sorely needed shops designed along the most modern ideas, there is not much use in spending funds for high-class new tools on any comprehensive scale. Last winter's experience, however, has taught not a few roads that a first-class tool may be worth far more than its cost in a single period of traffic interruption due to storms, if by its use cars get back into service a day or more earlier than would be possible with the older shop methods of equipment maintenance.

The market for electric motors in sizes up to 50-hp. rating is in a better condition to-day than for some time, owing to the efforts of the motor manufacturers to expand their production and accumulate at least moderate reserve stocks in the smaller units. Control apparatus also can be secured on about as favorable deliveries as motors. Railway companies which have paid some attention to modernizing their shop facilities during the last few years have reaped the reward of their efforts in not a few cases, and in view of the essential character of electric railway service, it is none too early to see what can be done toward improving this branch of shop facilities. Electric railway repair shops have not worked direct connection of motors to anything like its possibilities, and as a fuel-saving measure the problem of tool service betterment deserves consideration as well as from the standpoint of labor and material economy. The necessity for efficient shop operation was never so keen, and the cultivation of the field of improved tool applications is bound to yield results next winter which will be helpful to the railways and advantageous to the industrial and general public if the operating companies stand on their base as essential utilities and seek government co-operation in rendering better service.

G. H. Tontrup Forms New Company

The National Safety Car & Equipment Company, 418-419 Pierce Building, St. Louis, Mo., has been incorporated by George H. Tontrup, formerly for many years general manager of the American Car Company. Mr. Tontrup is president and treasurer, and associated with him as vice-president is Edward T. Bronenkamp, who was Southern sales agent of the American Car Company.

The new company will make a specialty of selling complete Birney safety cars and has made arrangements with the Cincinnati Car Company to build these cars. In addition the company will handle a general line of electric and steam car supplies.

Track Material Demands Increasing

Higher Fares, Government Financing and Prospects of Peace All Indicate Large Demand

While the demand for track and roadway specialties has not been very great since the spring months, the outlook for future orders never was brighter. Manufacturers who have made careful surveys of the existing conditions have found that while the needs for track renewals and track extensions are very pressing, there has been a persistent tendency on the part of the electric railways to mark time. This cannot be continued indefinitely and the very fact that little material could be bought during the past months indicates that with the very first assurance that permanent peace is about to be culminated, there will be an overwhelming demand for materials with which to construct long-needed extensions and essential maintenance repairs.

Daily developments steadily increase the list of railway companies granted financial relief by fare increases and the list of those seeking such relief. Many properties have found themselves facing the disagreeable fact that delay in repair work has passed the point of economy and each additional day is adding to the final reckoning, but credit conditions have not permitted of any intervention. As soon as necessary financial assistance assures the proper credit it is believed that rush orders will be placed for track materials.

We have already had several examples of government financing of railway extensions. The most recent which has come to notice is the financing by the United States Housing Corporation of 2 miles of track for the transportation of munitions workers on a Middle Western property. Indications are that there may be considerable of such government assistance given for extension and repairs necessary for the various war industries.

Except for priority orders it will be a case of first come first served. Even in case of an early peace present prices would not be materially reduced for say a year after the final settlement. It is therefore highly advisable that those companies which feel confident of relief in the near future place their orders for track materials without delay.

Rolling Stock

Springfield (Mo.) Traction Company has received word that the twelve new pay-as-you-enter cars being built by the American Car Company will be ready for shipment about Sept. 15. Upon arrival the older type of cars now in use are to be taken to the repair shops and equipped as pay-as-you-enter cars.

Trade Notes

Galena Signal Oil Company has cut its quarterly dividend from $3 to $1.50. A letter sent to the shareholders said that the reduction has been deemed necessary because of current high costs of labor and materials, which had reduced earnings.

Warren C. Drake, who for the past twelve years has been connected with the stoker-engineering department of the Westinghouse Electric & Manufacturing Company, New York, has entered into partnership with H. S. Sleicher, and has opened an office in New York, under the firm name of Sleicher & Drake, for the handling of power-plant equipment.

Lakewood Engineering Company manufacturer of cranes and hoists, announces the opening of new offices in Chicago, in the Lumber Exchange Building. Announcement is made also that the Charles T. Topping Machinery Company has merged its interests with the Pittsburgh office of the Lakewood Engineering Company, 411 Fulton Building.

Bates Expanded Steel Truss Company, Chicago, Ill., sole manufacturer of the one-piece expanded steel poles for utility transmission and electric railway service, is distributing a handsome glass desk paper weight to its customers and to inquiring friends. An illustration on the paper weight shows a typical Bates pole in combination with transmission, telephone, trolley and street lighting service. This souvenir is accompanied with an announcement that the paper weight is intended as a perpetual reminder of the utility of Bates poles.

New Advertising Literature

Independent Pneumatic Tool Company, Chicago, Ill.: Four-page folder descriptive of Thor pneumatic and electric tools.

R. H. Beaumont Company, Philadelphia, Pa.: Catalog 38, describing and illustrating the Beaumont drag scraper system for the ground storage of coal.

Electric Arc Cutting & Welding Company, 222 Halsey Street, Newark, N. J.: A circular giving advantages and uses of its alternating-current electric arc cutter.

H. W. Johns-Manville Company of New York City.: A comprehensive booklet on "Fuel Waste in the Power Plant." The booklet discusses the subjects of where to look for fuel losses and how to reduce and improve power-plant efficiency. It lists certain common but preventable causes of fuel wastage which can be corrected by the use of Johns-Manville or similiar material.

National Tube Company, Pittsburgh, Pa.: A paper entitled "The Preservation of Hot Water Supply Pipe in Theory and Practice" presented at the annual meeting of the American Society of Heating and Ventilating Engineers by F. N. Speller and R. G. Knowland.

Fisher Governor Company, Marshalltown, Ia.: A catalog describing and illustrating special governors, stop valves, reducing valves, back-pressure valves, balanced-lever valves, float valves, tank controller and other governors and regulating devices for pumps. In addition to the above the catalog also describes and illustrates other power-house specialties.

Wheeler Condenser & Engineering Company, Carteret, N. J.: Bulletin 112-A, just published, deals with condensers, pumps, cooling towers, etc. Under the head "Choice of Kind of Condenser" the two general classes of condensers are discussed. The remainder of the bulletin illustrates and describes other Wheeler condensing machinery in detail. The bulletin embraces large and small surface condensers, showing typical complete installations, rectangular and cylindrical types, jet condensers, barometric condensers, air pumps, rotative dry-vacuum pumps, the turbo air pumps, centrifugal pumps for circulating water and natural and forced draft cooling towers. In addition, a page is devoted to the feed-water heater and two pages to multiple-effect evaporators and dryers.

NEW YORK METAL MARKET PRICES

	Sept. 4	Sept. 11
Copper, ingots, cents per lb	26	26
Copper wire base, cents per lb	29.25	29.25
Lead, cents per lb	8.05	8.05
Nickel, cents per lb	40	40
Spelter, cents per lb	9.50	9.75
Tin, Chinese*, cents per lb	....	....
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

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* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Sept. 4	Sept. 11
Heavy copper, cents per lb	23.50 to 24.50	23.50 to 24.50
Light copper, cents per lb	21 to 21.50	21.00 to 21.50
Red brass, cents per lb	23.50 to 24.50	23.00 to 24.00
Yellow brass, cents per lb	16 to 16.75	16.00 to 16.50
Lead, heavy, cents per lb	7.50 to 7.75	7.50 to 7.75
Zinc, cents per lb	7.50 to 7.75	7.50 to 7.75
Steel car axles, Chicago, per net ton	$41.52	$41.52
Old carwheels, Chicago, per gross ton	$29.00	$29.00
Steel rails (scrap), Chicago, per gross ton.	$34.00	$34.00
Steel rails (relaying), Chicago, gross ton.	$60.00	$60.00
Machine shop turnings, Chicago, net ton.	$16.25	$16 25

ELECTRIC RAILWAY MATERIAL PRICES

	Sept. 4	Sept. 11
Rubber-covered wire base, New York, cents per lb	30 to 37	30 to 34
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40 to 36.75	32.40 to 36.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	35.00 to 37.72	35.00 to 37.72
T rails (A. S. C. E. standard), per gross ton	$70.00 to $80.00	$70.00 to $80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$67.50	$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$62.50	$62.50
T rail, high (Shanghai), cents per lb	4¼	4¼
Rails, rdger (grooved), cents per lb	4¼	4¼
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	*3¼	*3¼
Tie plates (brace type), cents per lb	*3¼	*3¼
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	*3¼	*3¼
Angle plates, cents per lb	*3¼	*3¼
Angle bars, cents per lb	*3¼	*3¼
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35

	Sept. 4	Sept. 11
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount†	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount	79%	79%
Waste, wool (according to grade), cents per lb	11½ to 22	16 to 40
Waste cotton (100 lb. bale), cents per lb.	13 to 13½	12 to 13
Asphalt, hot (150 tons minimum), per ton delivered	$38.50	$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$42.50	$42.50
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.90	$1.90
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.92	$1.92
White lead (100 lb. keg), New York, cents per lb	14	14
Turpentine (bbl. lots), New York, cents per gal	65½	66½

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* Government price. † These prices are f. o. b. works, with boxing charges extra.

Peacocks for Portland's Peaks

LOOK where you will on the Pacific Coast, it's a case of hills, hills and more hills.

So that braking is *always* a problem—especially during the long rainy spells of winter.

With this preface, it's not hard to understand why Portland, like other Pacific Coast towns, has scores of Peacocks as an absolutely reliable reserve.

Maintenance? As everywhere else. Not enough to talk about!

No braking job is too hard for the Peacock we suggest. Ask us when you are making old cars safer or new cars safe.

National Brake Co.
Buffalo, N. Y.

The Eccentric Drum.

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

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Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
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Electrical, Photometrical and
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Purchase, Finance, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties.
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OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
52 VANDERBILT AVE. NEW YORK
ELECTRIC RAILWAY MANAGEMENT
SUPERVISION OF CONSTRUCTION
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APPRAISALS
343 District Bldg. Washington, D. C.

You are a faithful subscriber and reader of the Electric Railway Journal. You know how useful it is to you. Why not give us the names of those of your electric railway friends who would also benefit by being subscribers to the Electric Railway Journal? We will be glad to send specimen copies to any names and addresses that you mention.
ELECTRIC RAILWAY JOURNAL

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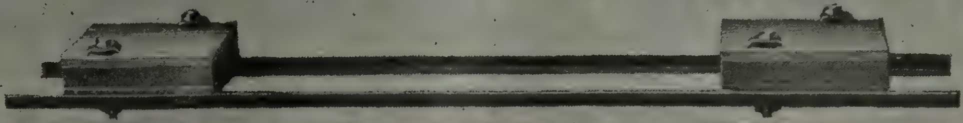
Analytical Studies of financial and operating conditions, appraisals and rate adjustments of electric railway and all public utility properties.
BOSTON, 14 Kilby Street CHICAGO, Conway Bldg.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Scofield Engineering Co. Consulting Engineers
PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

The MECHANICAL RAILWAY TIE

DMT Co



DMT Co

BETTER TRACKS
at Less Cost

Can Be Laid
by using
D.M. Ties all
the way!

**Permanent—
Resilient—
Economical**

Are the Result
of careful
construction.

And the best and most careful method known so far is that of using D.M. Ties.

And these Ties have **Made Good** with a vengeance.

Dayton Mechanical Railway Ties are not only a **theoretical** solution of track troubles. They are the **practical** outcome of years of work and tests on track carrying both city and heavy, high-speed, interurban cars.

Write for full particulars.

DMT Co

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO

DMT Co

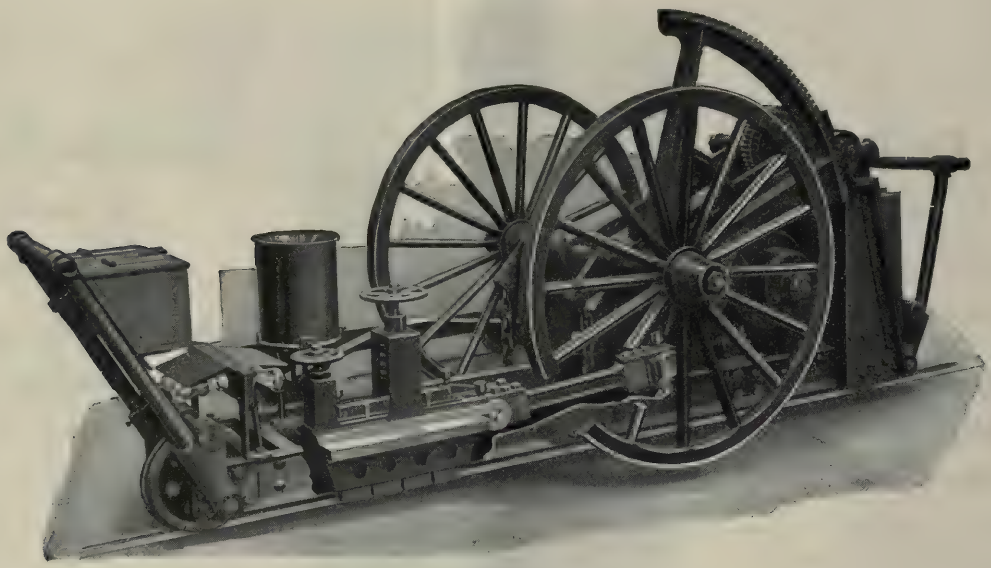
It Costs $2000 a Year Just to "Carry" a Mile of Track

Forty thousand dollars a mile is a conservative average figure for the cost of building track in paved streets.

This is not a "war time" price. Present emergency conditions do not figure in it.

At that figure the carrying charge for interest on the investment alone is at 5%, $2000 a mile per year.

Corrugations and cupped joints are the most destructive germs of track decay, not merely of the rail but of track foundations as well.



If the Use of a

Reciprocating Track Grinder

will kill these germs when they first begin to breed and thereby lengthen the life of your track by from three to six or seven years what is a Reciprocating Grinder worth in view of the above figures?

It is worth a lot more than it costs and the experience of a hundred companies proves it.

A Reciprocating Track Grinder used on your tracks means *great big* future economies.

We will be glad to prove that fact to you on your own tracks. Ask us to do it.

RAILWAY TRACK-WORK COMPANY

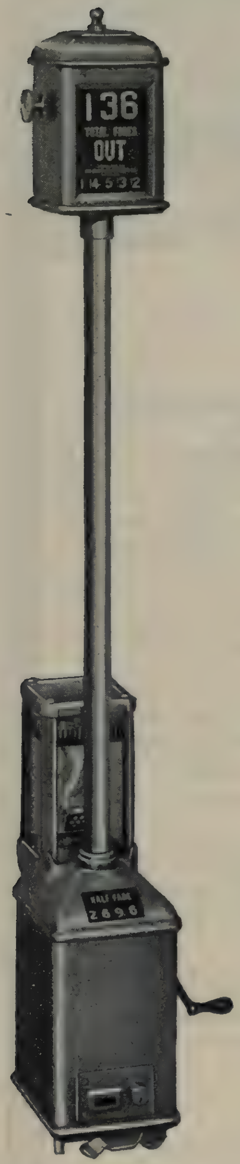
30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.

INTERNATIONAL

Coin and Ticket Registers

Eliminate Every Unnecessary Move In Collection and Registration



Type C14 Coin and Metal Ticket Register

The International does more than collect all the fares.

It *speeds up* fare collection.

It makes it *easy* for women—and older men to handle a huge crowd of passengers in a few seconds.

—without confusion.

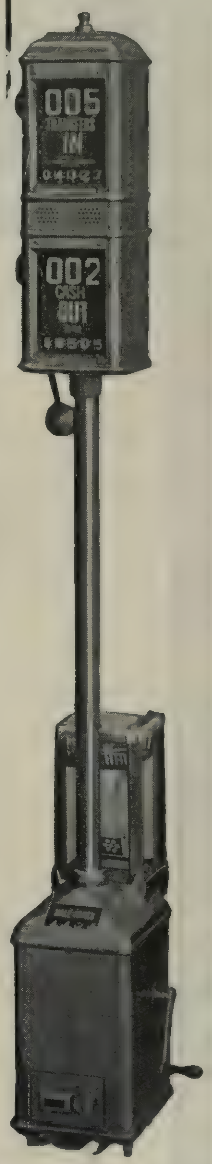
—without one paid-in fare getting by without registration.

Every Fare Must Register

Not only coins, but metal tickets and transfers.

Think over this saving in *time*—and *labor*—and *money*.

We also manufacture single and double registers; Coin Counting Fare Boxes; Motor-Driven Station Registers; and sole agents for Heeren Enamel Badges.



Metal Ticket and Type C20 Coin Transfer Register

The International Register Company

15 South Throop Street CHICAGO, ILL.

Standard Equipment in New Orleans

Wherever they have been tried, Johnson Fare Boxes have made good as a 100 per cent. efficient method of fare collection and accounting.

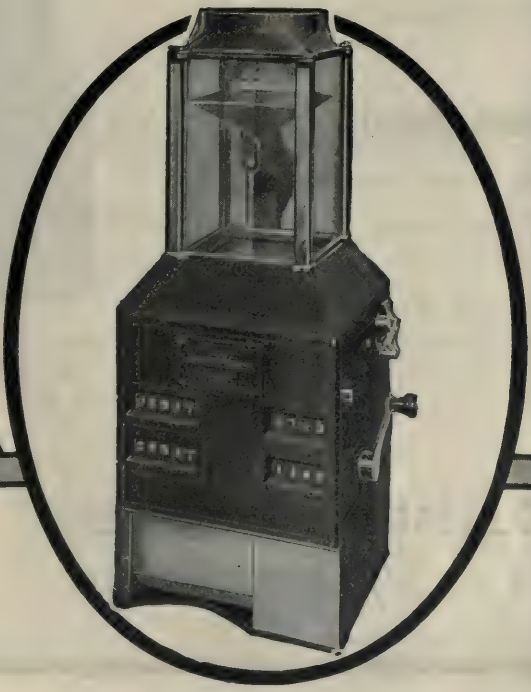
Take the New Orleans Railway and Light Co. as an instance. This company writes:

"The Johnson Fare Boxes are used on a number of our trunk lines with satisfactory results. The writer was for many years identified with the —— Railway Co., during which time had occasion to try out several types of fare boxes, with the result that we finally adopted the Johnson box as standard for the system.

"In view of the good results obtained from the use of the Johnson box, it is the intention of the New Orleans Railway and Light Co. to ultimately so equip all the cars on the system."

The above has been the experience of many important railway systems throughout the country, where more than 10,000 Johnson Fare Boxes are giving satisfactory service.

Full details on request.

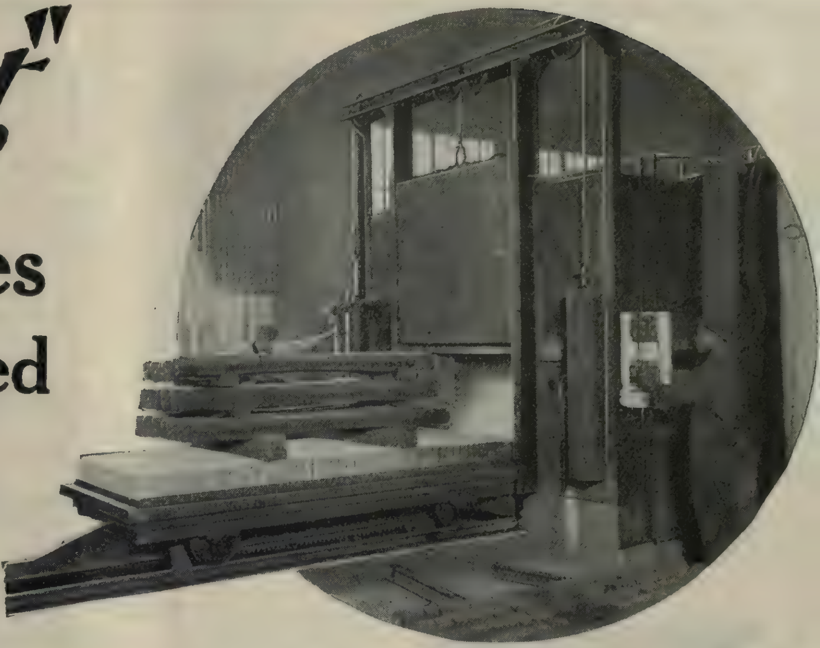


Johnson Fare Box Company

Jackson Boulevard and Robey St., Chicago

50 East 42nd Street, New York

"Electroheat" Axles Insure Increased Safety *and* Service



A charge of "Electroheat" Car Axles entering the Electric Furnace for heat-treatment

TODAY the paramount thought of the railway operating man in every purchase he makes has become "Economy Always—but **Safety First.**"

Of vital importance in the production of steel axles is the **process** of heat treatment by which the essential physical properties of a good axle steel are obtained.

The "Electroheat" process in axle making has done more than to insure greatest possible safety through the high refinement of steel and improved physical qualities—it has made it possible to **consistently** produce axles having such uniformity in strength and toughness; which means greater over-all axle life with maximum safety.

That's why "Electroheat" Axles minimize service failures due to breakage, bending and excessive journal wear. That's why they **have** to give better service!

Note: "Electroheat" Armature Shafts possess the same torsional and shock-resisting qualities as "Electroheat" Axles, being heat-treated by the same process. They minimize service breakdowns and maintenance costs.

LOOK FOR VALSCO ON EVERY AXLE

"If Heat-Treated Electrically—It's a VALSCO"

LACLEDE STEEL COMPANY

General Offices—Federal Reserve Bank Building

SAINT LOUIS, MO., U. S. A.

THE Lincoln Bonding Machine is a traveling repair shop. Under present conditions worn and broken parts have to be used until new parts can be received.

The quickest and simplest way is by the use of a Lincoln Bonding Machine.

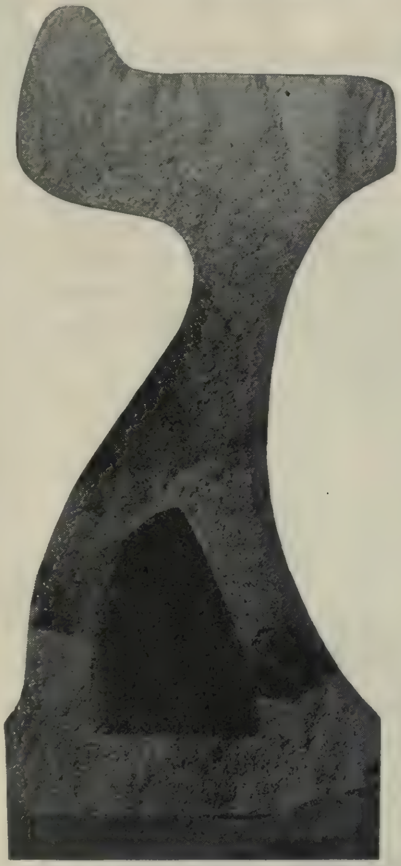
Any and all kinds of metallic and carbon welding made easy.

The Lincoln Bonding Machine is the lightest and most efficient machine today.

This is the bond that when welded to your rail joint shows a saving of 25-35 cents per bond. We prove this saving over any other method.

THE LINCOLN BONDING CO.
636 Huron Road, Cleveland, Ohio

Agents: Boston, Charles N. Wood Co. New York, Atlantic Welding Co. Philadelphia, Railway Track-Work Co. Pittsburgh, Electrical Engineering & Manufacturing Co. Chicago, Holden & White, Inc. St. Louis, W. L. Rose Equip. Co. Milwaukee, W. C. Burdick. Los Angeles, Wigmore, Hall & Co. Chattanooga, Tenn., Chattanooga Armature Works. Canada, Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.



GRIFFIN F. C. S. WHEELS

embody the results of scientific development, service data, and an engineering investigation.

Our BULLETIN 18 on chilled iron car wheels for street car and interurban service will give you complete data as to patterns, etc.

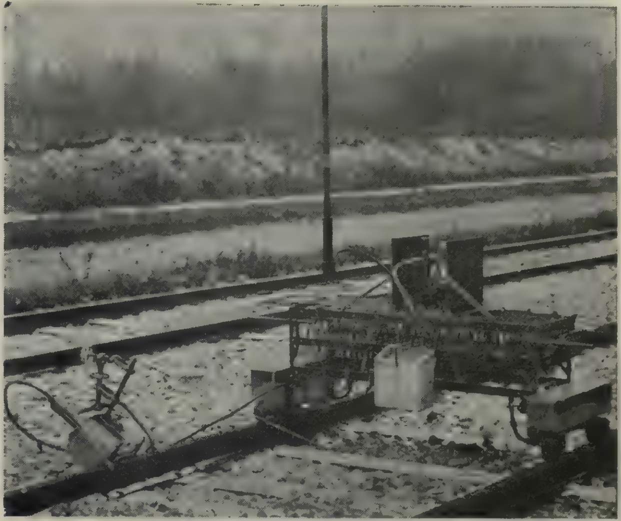
F. C. S. wheels mean moderate cost, safety, high mileage and brake shoe economy.

All of our foundries are equipped with complete machine shop facilities for pressing wheels on axles.

GRIFFIN WHEEL COMPANY
McCormick Building, Chicago, Ill.

FOUNDRIES
Chicago Detroit Boston Denver St. Paul
Los Angeles Tacoma Kansas City

ERICO
A Real
PORTABLE
Arc Welder
and Rail Bonder



ERICO
THE LINE OF LEAST RESISTANCE

Some of the so-called portable arc welders are not portable at all—merely movable. The Erico Arc Welder mounted on wheels weighs only 140 lbs. The bonding furnace weighs only 65 lbs. The equipment can easily be handled by two men.

A tried, efficient and practical necessity for every railway.

Write for details and prices.

The Electric Railway Improvement Co.
Cleveland, Ohio

Blast Furnace Slag

A careful process of preparation has made possible the transformation of blast furnace slag into modern reinforced concrete structures; into indestructible and unsurpassed wearing surfaces on some of the best roads of the country; into concrete water tanks that have served their purpose for years without signs of leakage; into fireproofing materials whose fire resistive qualities are unequalled; into foundations for heavy machinery; into culverts, dams, bridges and many other uses in a wide and varied field of industrial usefulness.

It has been found—

1. That slag is the lightest form of concrete aggregate available.
2. That its strength is unsurpassed by the best stone aggregate.
3. That its chemical composition insures a material that is practically everlasting—it cannot disintegrate.
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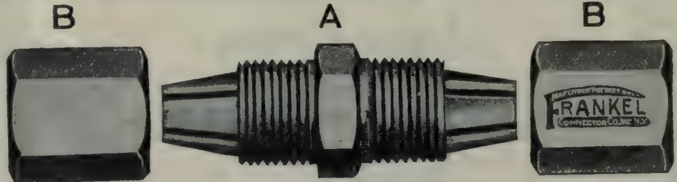

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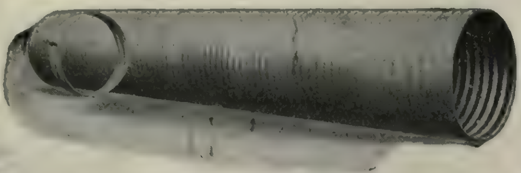

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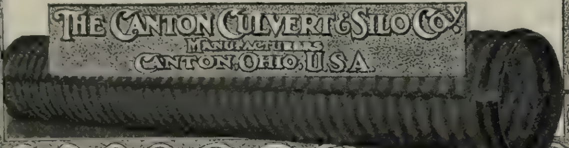

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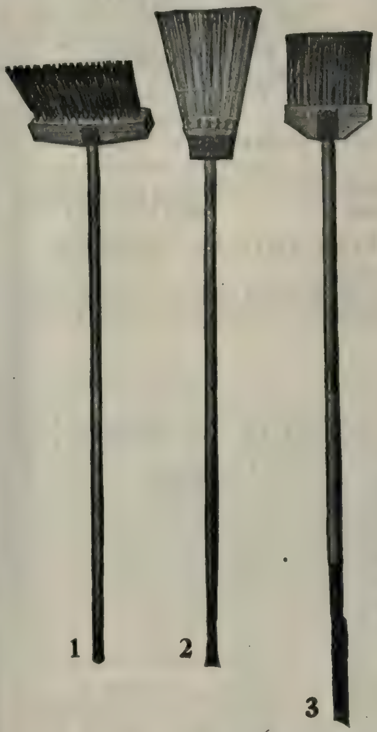

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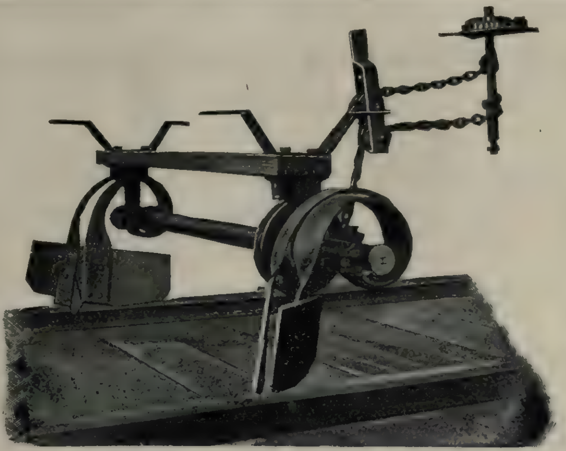

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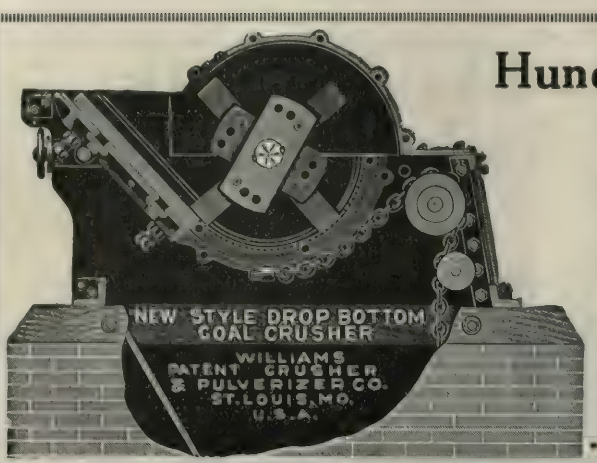

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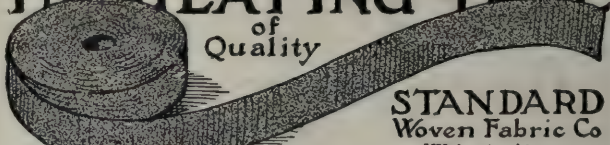

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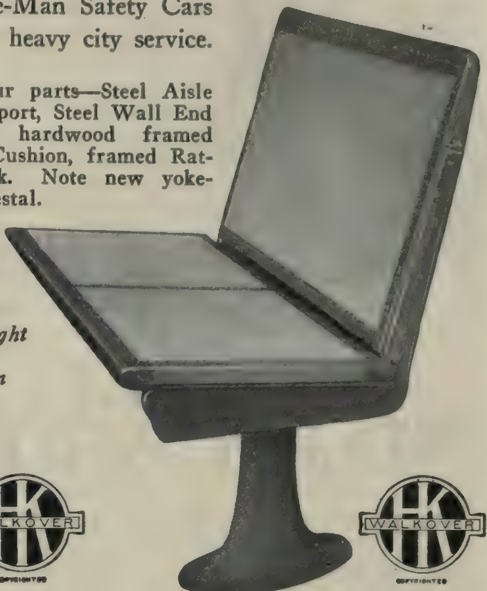

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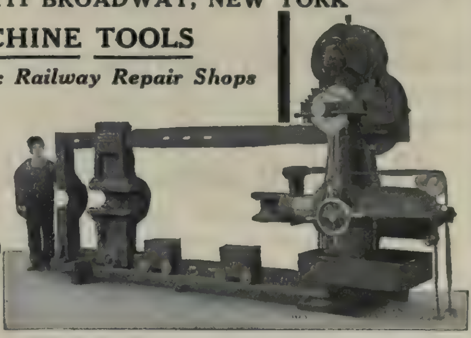

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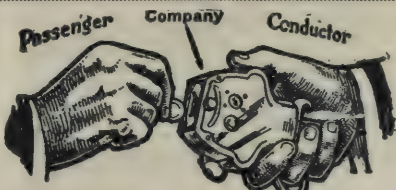

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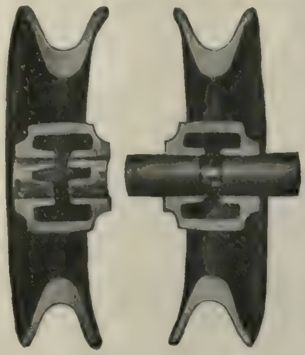

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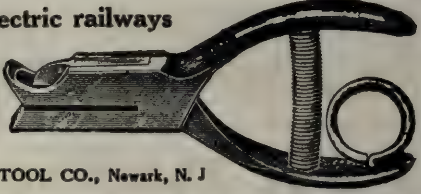

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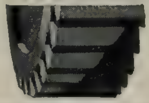

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2—Brill 39-E Maximum Traction Trucks.

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AIR COMPRESSOR

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Capacity, 1160 cu.ft.
Diameter, steam cylinder, 20 in.
Diameter, L.P. air cylinder, 22 in.
Diameter, HP. air cylinder, 14 in.
Stroke, 24 in.
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Price, $1500.00.

Thoroughly Overhauled and Ready for Immediate Shipment.

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Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

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6—Type WH 12-A Motors and Fields complete.
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for Boiler Shop about 16 feet long, electrically driven, A. C. current, 3-phase, 60-cycle to roll not less than one-half inch plates, top roll not more than ten inches in diameter. Send photograph with full detailed description, stating age, where same may be inspected, etc., to

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new and on original reels.

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30-hp., 625-r.p.m., 500-v.

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Type HC, 25 cycle, 375 r.p.m., 250 volts, complete with General Electric Type ABH air blast transformers with blowers and motors, 2 General Electric Type IRH Potential regulators and Blue Vermont Marble Switchboard, consisting of 2 High Tension panels, 2 machine panels, and 4 feeder panels for 3-wire distribution. All equipment in excellent condition and ready for immediate delivery. Equipment can be seen running.

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ASSISTANT SUPERINTENDENT wanted by street railway in southwestern city of twenty thousand, operating twelve cars. Excellent opportunity for energetic man. P-239, Elec. Ry. Journal, Chicago.

TWO first-class all-around barn men wanted for small street system. State experience fully, salary wanted, and when you can report for duty. Pascagoula St. Ry. & Power Co., Pascagoula, Miss.

THOROUGHLY efficient, competent and tactful man wanted for position as superintendent or transportation for small street railway system. State experience fully, furnish recommendations, advise as to age, married or single, salary wanted and when you could report for duty. Pascagoula St. Ry. & Power Co., Pascagoula, Miss.

ENERGETIC superintendent of transportation wanted for city of 50,000 South East. Applicant must have proven ability to handle men and obtain results. Give in first letter experience, nationality, age, weight, references, salary expected, relation to military service, and supply small photo. Address P-241, Elec. Ry Journal, Porto Rico.

SUPERINTENDENT of rolling stock wanted; expert inhandling labor, able to obtain efficient and economical results in car maintenance and operation. State fully past experience, age, whether subject to draft, nationality, salary and supply kodak picture. Address P-240, Elec. Ry Journal, Porto Rico.

TWO good night barn foremen by medium sized interurban and local railway company in Ohio. P-243, Elec. Ry. Journal, Ohio.

TRAINMASTER wanted. Must be a man of tact, capable of handling men and maintaining discipline without creating discord. City and suburban service. Possibilities of advancement. P-244, Elec. Ry. Journal, Conn.

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TRAFFIC manager with two well known interurban lines for 15 years, later with steam line. Desirous of returning to interurban service. Exempt from draft. References furnished. PW-242, Elec. Ry. Journal, Chicago.

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Oxweld Acetylene Company.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Anchors, Guy.
Electric Service Supplies Co.
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Ohio Brass Co.
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Laclede Steel Co.

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Bemis Car Truck Co.
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Carnegie Steel Co.
Laclede Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
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Westinghouse Elec. & M. Co.

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Columbia M. W. & M. I. Co.

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Electric Service Supplies Co.
International Register Co., The

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Johns-Manville Co., H. W.
Nichols-Lintern Co.

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Electric Storage Battery Co.

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Zelnicker, Walter A., Supply Co., Inc.

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National Tube Co.

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American Steel & Wire Co.

Bonding Apparatus.
American Steel & Wire Co.
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Electric Service Supplies Co.
Imperial Brass Mfg. Co.
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Niles-Bement-Pond Co.

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Hubbard & Co.
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Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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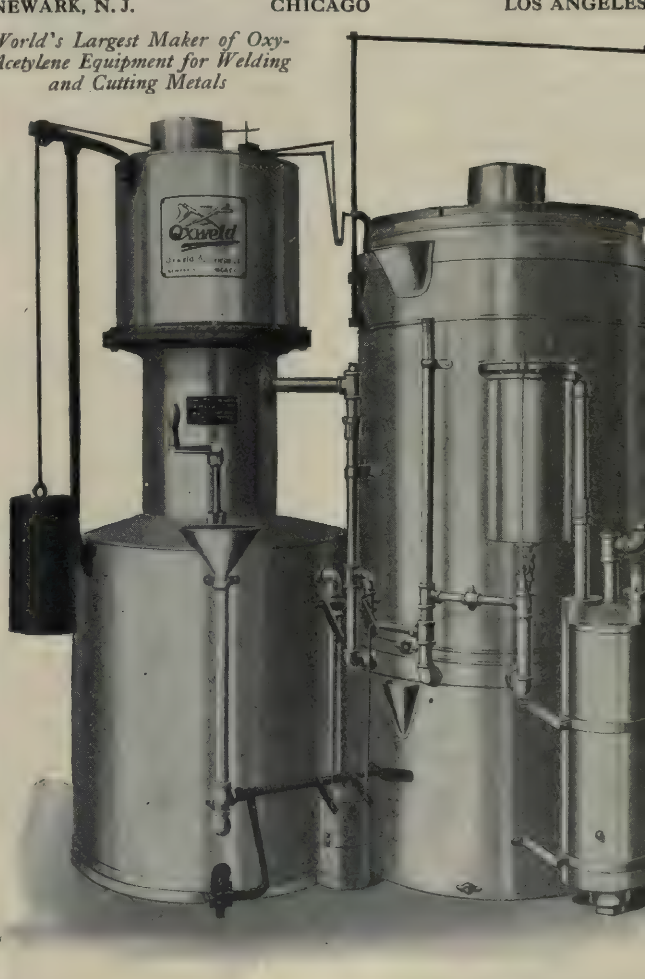

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Whenever anyone complains about the service being given in the cars, whether it is a Local advertiser himself or the representative of a National advertiser, the Home Office should be immediately advised of the complaint and also as to the cause for the same, and whether or not the condition complained of has been corrected. Should the correction of such conditions involve the removal of any cards, however, it should not be forgotten that this can be done only upon instructions from the Home Office; th
fore, nothing should be do
say to the party com
notify the
fo

COLLIER SERVICE

Reaches Out To Oakland

The San Francisco-Oakland Terminal Railways in serving the Bay Cities—Oakland, Alameda and Berkeley—deal with one of the most discriminating groups in the country.

These riders expect high-grade service in every respect. Many of them are keenly appreciative of the car cards and their messages.

Fortunately, the advertisements in these cars are solicited and placed by Collier Service, which is just another way of saying that they exert maximum drawing power.

And this maximum drawing power means maximum returns to the advertiser, and therefore his willingness to continue to pay the railway through Collier Service for this form of publicity.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

Just a Part of the Columbia Equipment for Turning Out Bearings

You will understand the perfection of Columbia-made products when we tell you that we have several hundred machine tools alone.

Practically each tool, be it drill, shaper, borer, grinder, planer or lathe, is handled by the same man day in, day out.

Such specifications inevitably results in turning out the best possible work.

That's only one of many reasons for using Columbia-made products.

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.

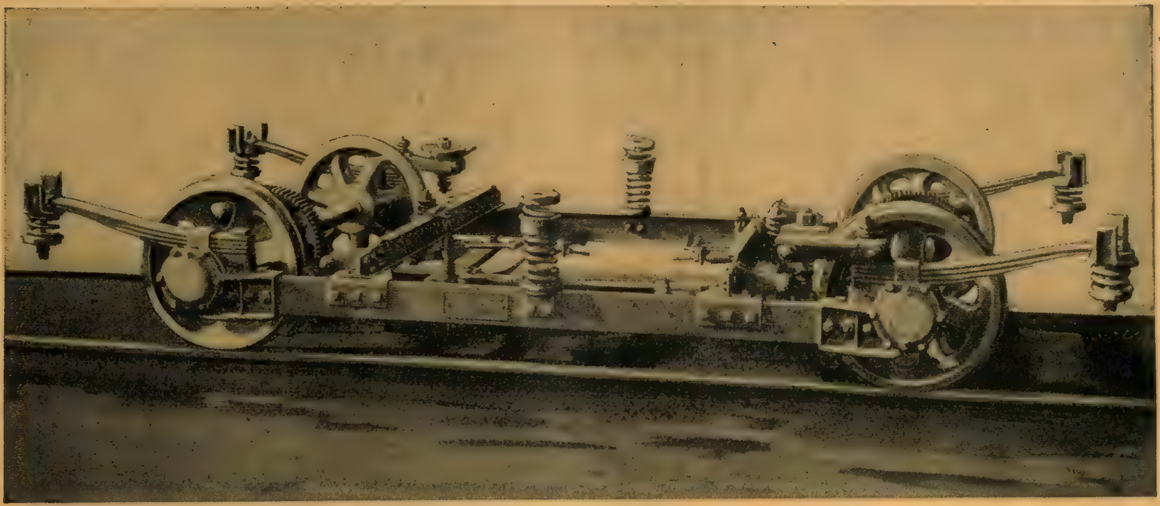
TOOLS

- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

THE SAFETY CAR TRUCK



THE Brill 78-M Truck was specified for the 35 Birney Safety Cars recently ordered by the Southern Pacific Company, 20 of which are for use in Los Angeles. This truck was expressly designed for the Safety Car to correspond with its light weight and weighs, with wheels and axles, only 3300 lb. The large reduction in weight was gained by putting practically all the load on the end springs and bolting the quarter-elliptics to the journal boxes, thus avoiding the necessity of having the usual heavy frame. Mounting the car on quick acting spiral springs, link suspended from the ends of slower acting quarter-elliptics, completely cushions it against all kinds of vibrations and jolts. A link device, which works on the same principle as the bolster guide of Brill pivotal trucks, permits and controls side easement at curves. Send for a copy of Bulletin 234 and become better acquainted with the 78-M, the Standard Safety Car Truck and one of the most important trucks of modern times.

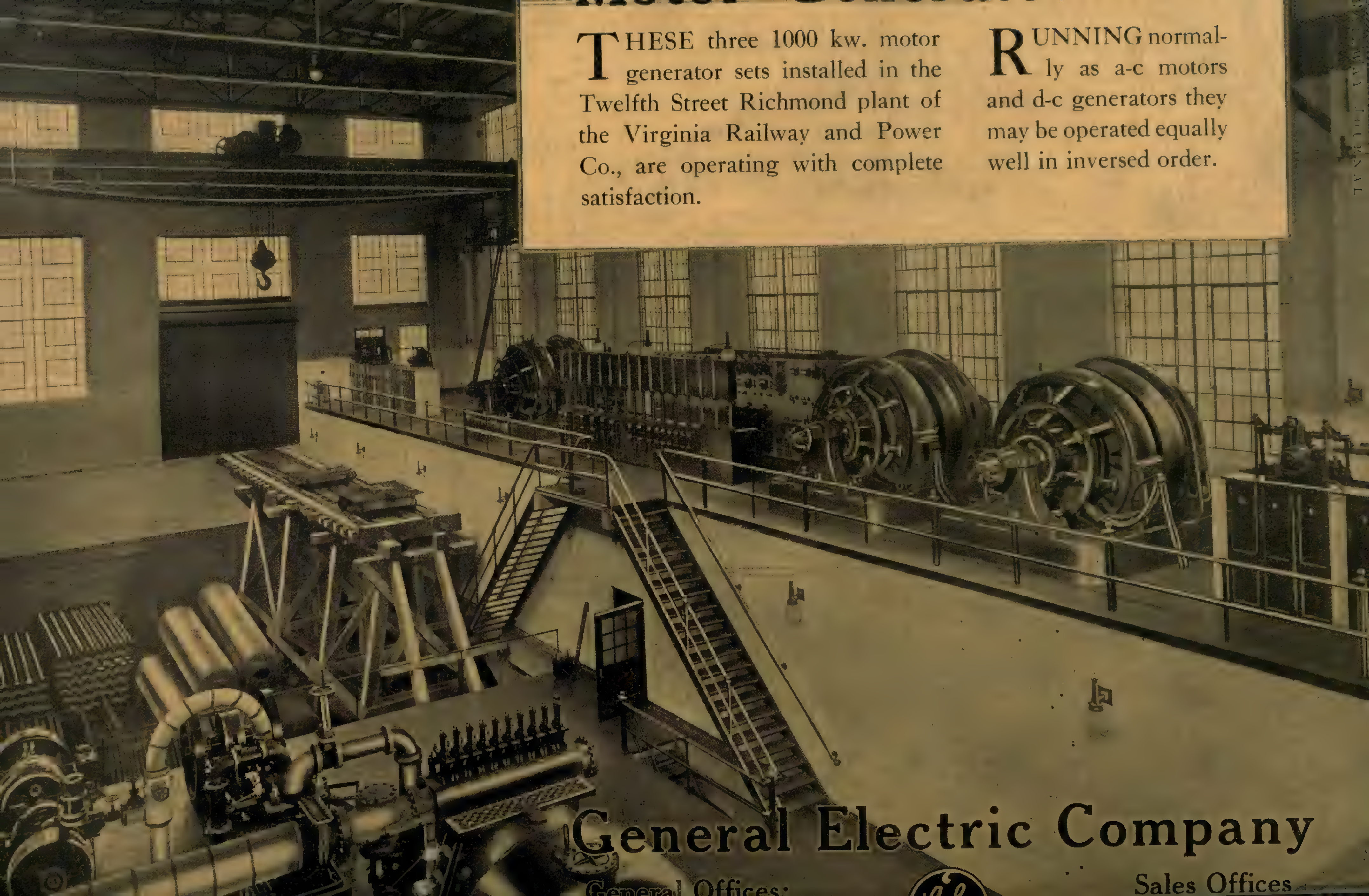
J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

BRILL

AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.



THESE three 1000 kw. motor generator sets installed in the Twelfth Street Richmond plant of the Virginia Railway and Power Co., are operating with complete satisfaction.

RUNNING normally as a-c motors and d-c generators they may be operated equally well in inversed order.

General Electric Company

General Offices:

Sales Offices

Fifteen Cents Per Copy

Special Mechanical and Engineering Edition

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc.
September 21, 1918

UTILITY
U.S. FUEL ADMINISTRATION DEMANDS THAT ELECTRIC RAILWAYS SAVE COAL.

A Remarkable New Improvement Guaranteed to Maintain the Temperature in Y
Cars Within a Range of 1 Degree!

The most efficient thermostatic heater regulator has been our Utilit
regulated car temperature within a range of four degrees and saved
than 50% of the heating energy.

THE NEW UTILITY

exceeds even that record. It regulates within one degree and sav
additional 2.33 kilowatts per hour per car, based on 11 k.w.h. av
consumption per hour. *Get the New Bulletin.*

RAILWAY UTILITY COMPANY
141-151 WEST 22nd St., Chicago, Ill. 1328 BROADWAY, New York,

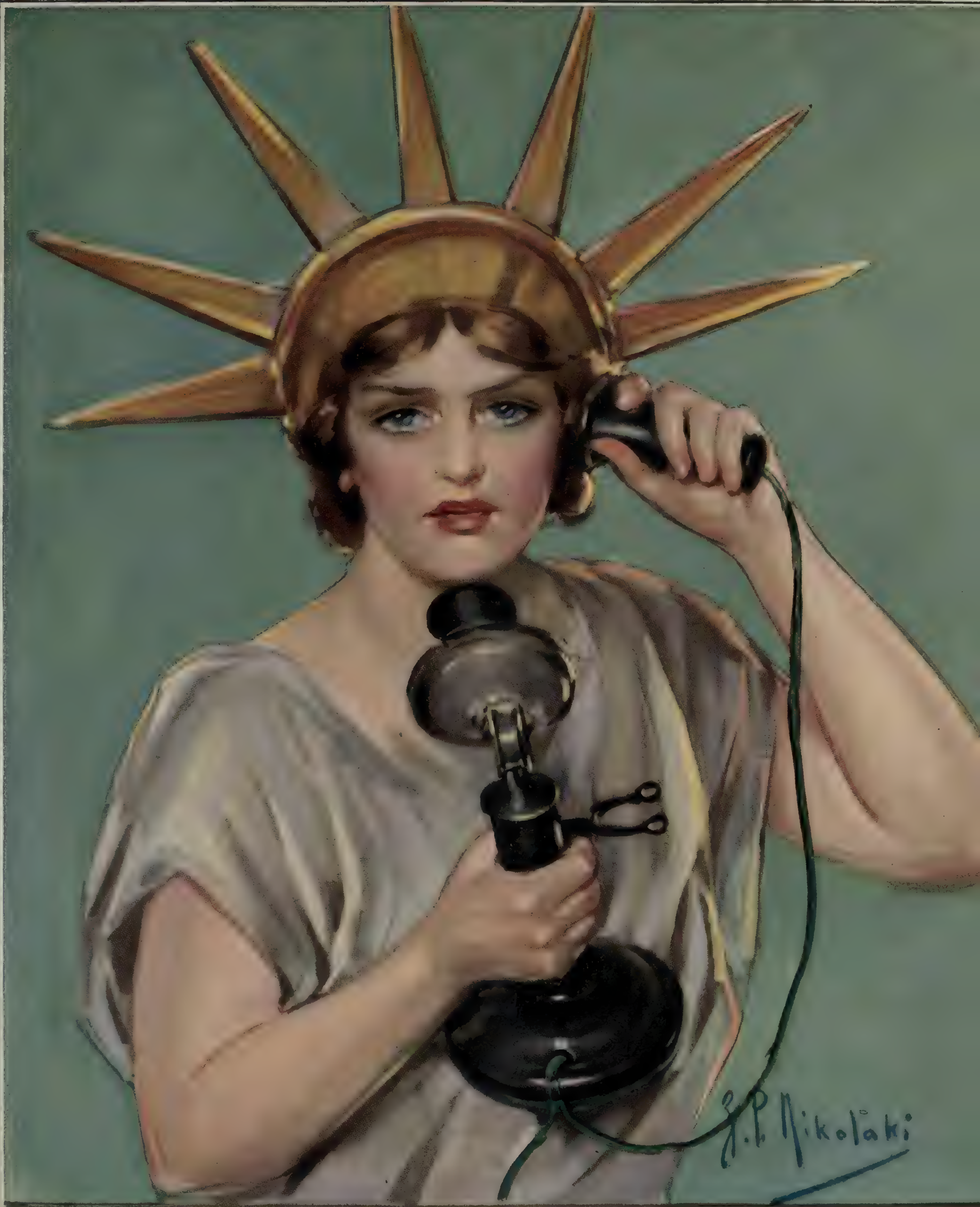
Electric Railway Freight Haulage On The Auburn & Syracuse Railway

The way for electric railways to build up freight business is to go at it like a regular railroad. The Auburn & Syracuse road has done this. It is helping win the war by hauling freight efficiently and promptly to Split Rock, with a standard class B, 50-ton Baldwin-Westinghouse Electric Locomotive, equipped with Westinghouse No. 562 Field Control Motors and H L Control.

The Vice-President of the road recently stated: "It's a peach. I want to compliment the Westinghouse Company on their Standard Locomotives. It's doing fine work."

The Baldwin Locomotive Works,
Philadelphia, Pa.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



HELLO!
THIS IS LIBERTY SPEAKING—
BILLIONS OF DOLLARS ARE NEEDE
AND NEEDED NOW

Supplement to Electric Railway Journal, September 21, 1918.

Vol. 52, *No.* 12 New York, September 21, 1918 *Pages* 487 to 534

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H. W. BLAKE, *Editor*

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Air Brakes for Every Service

"SAFETY" Car, Northern Texas Traction Co., Fort Worth, Texas, Weight, 14,000 lbs. Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers; automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.

Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.

TRADE WA MARK

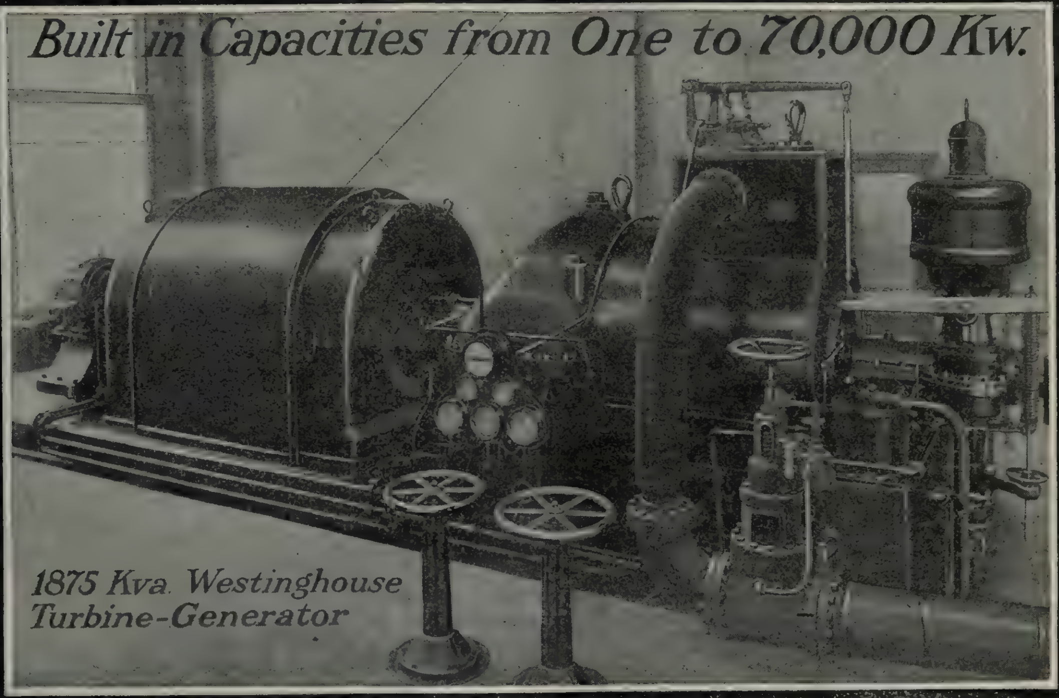
Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco.
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

Brake Building our Business for a Lifetime

Westinghouse

Turbine Generators



Built in Capacities from One to 70,000 Kw.

1875 Kva. Westinghouse Turbine-Generator

Westinghouse was first to develop and to introduce into this country, the **Alternating** Current System of Power Generation—which has made it possible to transmit electric current hundreds of miles economically.

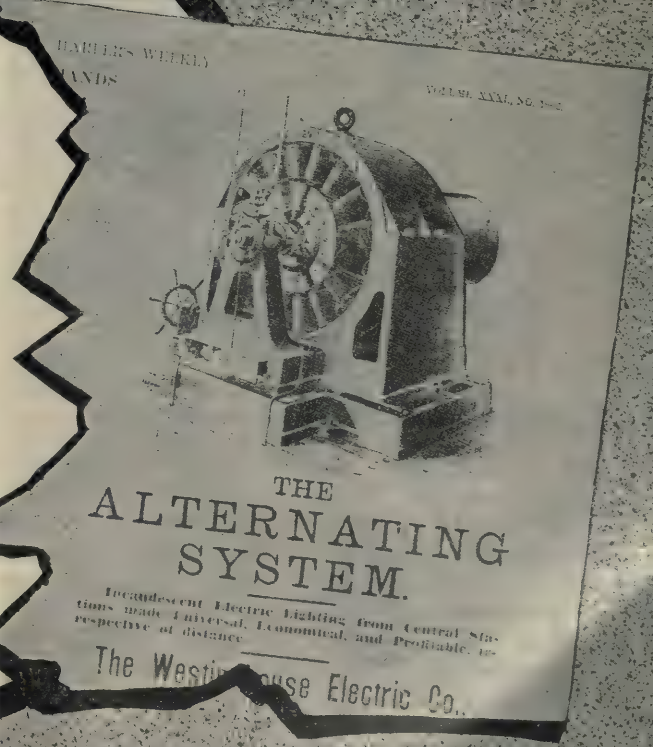
As a consequence, distribution lines stretch out over this country like mighty arteries, supplying power for all purposes.

The clipping from Harper's Weekly shows the first **Alternating** Current Generator advertised in this country.

The illustration above shows a modern Westinghouse Alternating Current Turbine-Generator in the plant of the Tug River Power Company.

Westinghouse Electric
& Manufacturing Co.
East Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC

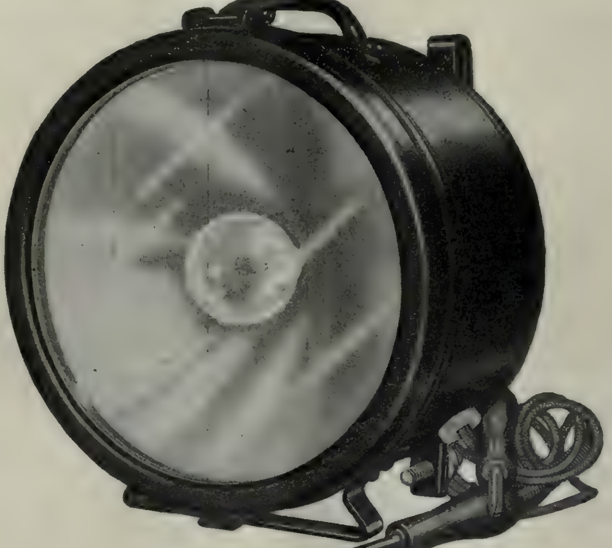


HARPER'S WEEKLY

THE
ALTERNATING
SYSTEM.

Incandescent Electric Lighting from Central Stations made Universal, Economical, and Profitable, irrespective of distance.

The Westi ouse Electric Co.



TYPE SDP—PORTABLE
Imperial Incandescent Headlight for Interurban Service.
With 12-in. reflector takes focus type lamp up to 250 Watts,
with 16-in. reflector focus type lamp up to 500 Watts.

How Imperial Incandescents Utilize All the Light

Crystal Ray Reflector—used in Imperial Incandescents — concentrate the lamp light in a clear, sharp beam on the track.

Crystal Ray Reflectors are clear glass parabolic mirrors ground and polished on both sides and with a permanent silver backing. Spectrophotometric tests as well as actual experience proves that these are the most efficient of commercial reflectors.

All Imperial Incandescents have a simple focusing means which makes it easy to have the lamp at the focal point—important if full value of the lamp is to be obtained. The portable headlights have adjustable bumper studs which allow the beam to be leveled on the track.

Imperial headlights are dust proof and weather proof, so such things cannot interfere with their efficiency.

There are Imperials for every class of service from one man cars to the highest speed interurban. Get in touch with our headlight specialists.

The Ohio Brass Company
Mansfield, Ohio
General Sales Agent in U. S. for Crouse-Hinds Imperial Line.

On Fluctuating Voltage

Imperial Luminous Arcs are recommended if voltage varies to any considerable degree because they maintain a powerful light on voltage low enough to reduce materially the efficiency of an incandescent lamp.

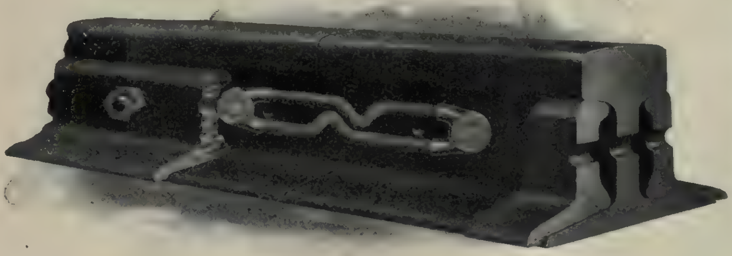
Gold Ray

Imperial Incandescents for interurban and suburban service may be equipped with Gold Ray reflectors — yellow glass mirrors.

If a beam of a decided yellow hue is desired Crystal Ray Reflectors with "Nogdore" door panes should be used.

OB PRODUCTS

Quality First



O-B Compressed Terminal Bond

O-B Gas Weld Bonds

Is the Peak Hour Load Too Big?

With all your cars on the line drawing heavy current can your power plant carry the load? Good bonding may save enough current to make your present equipment adequate.

Every poorly bonded joint is a leak—a leak which can be plugged easily.

Besides that good bonding prevents most burnt-out armatures; improves schedules; makes voltage better.

O-B Bonds are good bonds.

Send for "Return Circuits and Rail Bonds."

THE OHIO BRASS COMPANY, Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles

Phono-Electric

on Main Street, Naturally.

Since 1910, the Virginia Railway & Power Company has had 2 miles of No. 0000 grooved Phono-Electric trolley wire on Main Street between Second and Twenty-first Streets.

The distribution department says of this and other Phono-Electric installations: *"If your track and trolley wheels are good, Phono-Electric will last for years and years."*

PHONO-ELECTRIC TROLLEY WIRE

never fails to give satisfactory service because it is not only uniformly tough part of the time, but uniformly tough all of the time.

2115

Bridgeport Brass Company

Bridgeport Connecticut

Concreting 1320 Ft. of Track Daily

INTERNATIONAL
STEEL TWIN TIES

Make That Schedule Easy

200 cubic yards of concrete is being mixed and placed in 10 hours by a gang of twenty-five men on a number of street railway properties. With 800 cubic yards of concrete to the mile of steel twin tie track below the rail base, this gang will concrete completely 1320 ft. of track in 10 hours.

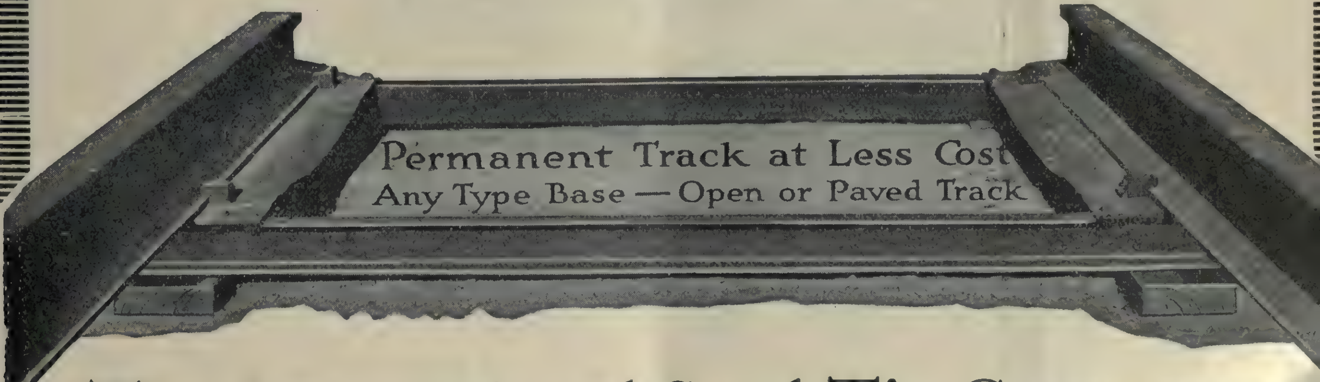
Steel twin ties in a seven-foot trench and with seven inches of concrete in bearing below tie plate requires less than 800 cubic yards per mile of track. That's why you can speed up the job to 132 ft. of track per working hour. Less equipment and fewer men would not move so fast, but the ratio of progress would remain the same.

In addition, the excavation is reduced 50% and the number of ties to handle 66%. These also mean labor saving. And your track is out of service for a shorter period.

Ask the users of steel twin ties if you want to check these facts.

A stock of low-priced steel in hand insures a "rock bottom" price and prompt delivery. Order now and you'll be a regular user next year.

Prompt deliveries made from stock.


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

Representatives:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal., Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegle Minneapolis, Min

DREW

DESIGN plus QUALITY

is Rewarded

3500 Drew Frogs and Crossings on one order by one Company

What is conceded to be the largest single order for overhead frogs and crossings ever placed by any company was placed in July by the Chicago Surface Lines.

In view of the fact that the order was placed after a service trial covering a period of more than three years, it is significant that the order was given to the Drew Electric & Mfg. Company.

Design and Quality were thereby again rewarded. Shipment was made from stock.

This order is of great significance to other railways, not only because it is the largest ever placed, but also because it is a tribute to material which has stood up for years in the hardest overhead service in the world—the Chicago Loop.

The same design and quality, which were factors in securing this order is found in all of the overhead line material manufactured by this company. This includes Clinch Ears, Splicers and Splicing Ears, Frogs and Crossings, Section Insulators, Pole Line Hardware, Tools, etc.

All Drew Specialties, including the Drew Protective and Reclaiming Pole Sleeve, the Drew Motorman's Safety Mirror, the Drew Pipe Insulator, are guaranteed to be free from defects in material and workmanship.

Write for your copy of our 1918 *catalog.*

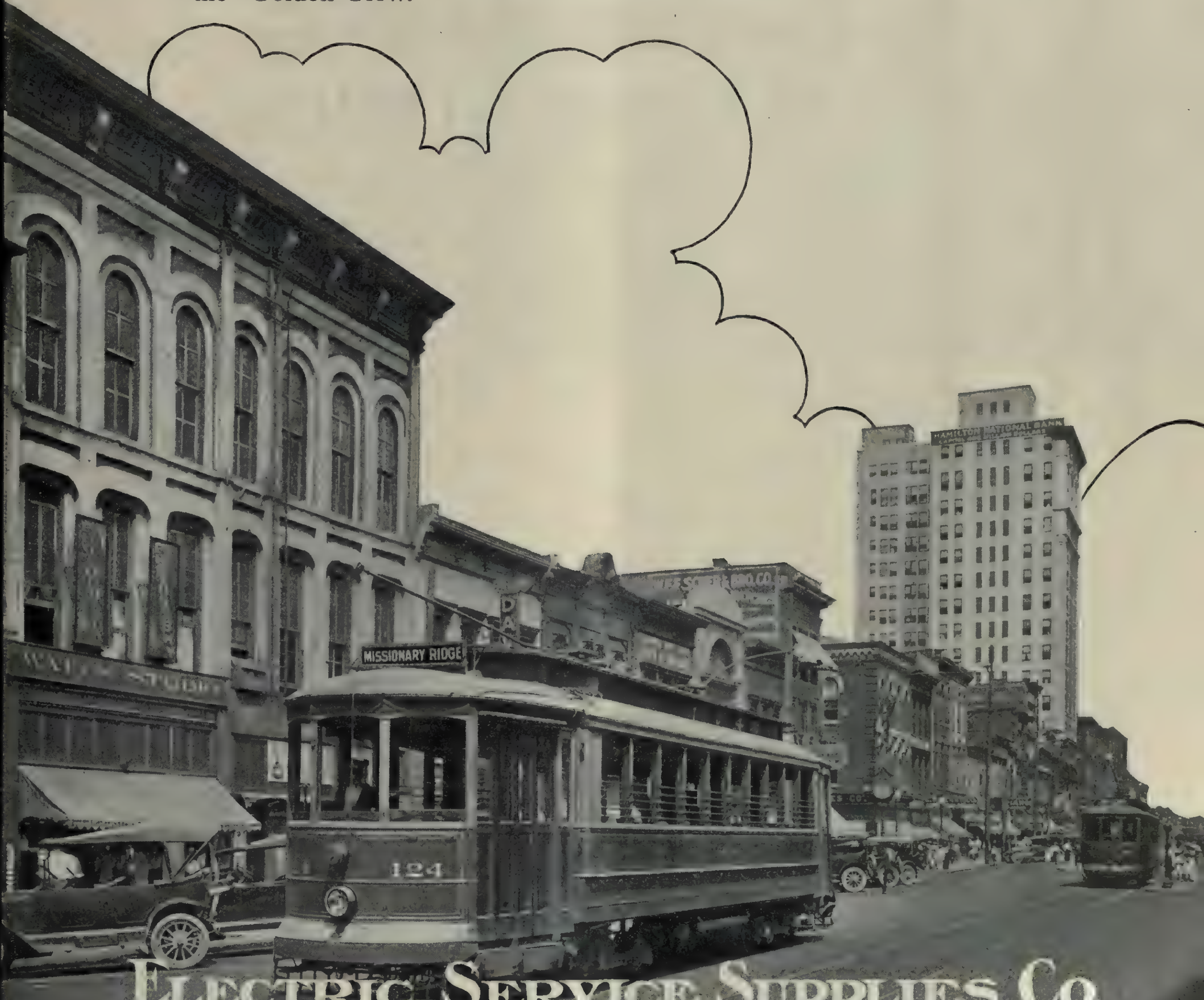
DREW ELECTRIC & MFG. CO.

Offices and Works:
1016 E. Michigan St., Indianapolis, Ind.

DOWN IN CHATTANOOGA

Practically all of the cars of the Chattanooga Railway and Light Company are now equipped with "Golden Glow" Headlights.

In that beautiful southern city the Operating Company and the people all delight in having their cars equipped with the most highly developed headlights —the "Golden Glow."



ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

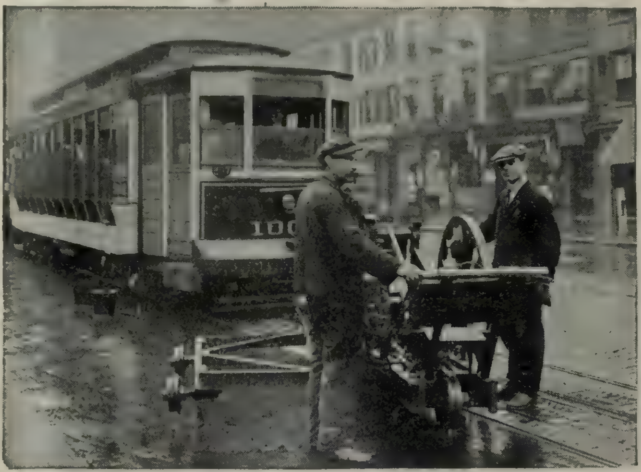
PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

For the Emergency Job or the Steady Grind



RECIPROCATING TRACK GRINDERS

save money for the scores of companies using them.

First, by keeping tracks in *constantly* good condition. This reduces wear and tear on both track and rolling stock and consequently reduces repair and replacement costs on both. Definite figures of the damage to rolling stock caused by bad track would be hard to get at but it is unquestionably a big item.

Second, Reciprocating Grinders make it economical, practical and simple to restore to good condition, by grinding, even extremely bad stretches of track.

In the second case the saving is of course immediately obvious and usually means a good amount in a lump sum.

In judging the value of the Reciprocating Grinder, however, the fact that many railway companies have saved by grinding (instead of replacement) sums as high as $40,000 on a single stretch of track should not obscure the fact that these machines are turning in savings *every day* to companies that use them regularly for efficient track maintenance.

A thousand dollars saved has the same value whether it is in the shape of a thousand dollar bill or 500 two-dollar bills.

RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia
AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.

Chicago & West Towns

The Dial of the ECONOMY RAILWAY METER Shows the Motorman Just How Much Energy He Uses

Installs ECONOMY RAILWAY METERS

because

They meter the ENERGY, and that's what the management wants to save

The Chicago & West Towns Railway Co. is equipping all its street and interurban car with ECONOMY RAILWAY METERS. This railway serves a densely populated sub urban district adjacent to Chicago. Its equipment and operating methods are up to date.

ECONOMY METERS were chosen for that company's power-saving work because—

Through the use of ECONOMY METERS the railway wil gain all the results obtainable through other checking devices, and in addition, will gain engineering and transportation data of high value.

This device on your cars will speedily pay for itself in th savings it effects.

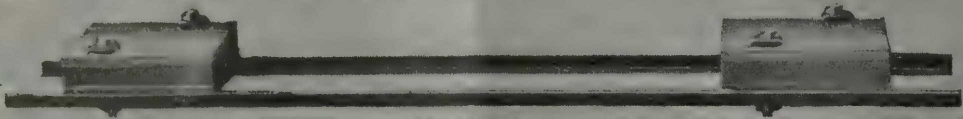
Let us send you our illustrated booklet describing it.

"The Watchdog of Your Power"

Economy Electric Devices Co.
L. E. GOULD, Pres.
Exclusive Sales Agent
Sangamo Economy Railway Meter
Old Colony Bldg., Chicago

The MECHANICAL RAILWAY TIE

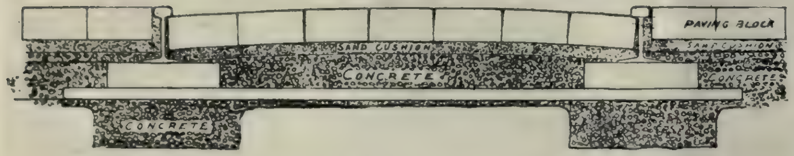
DMT Co



Cost Comparison

One very strong point in favor of Mechanical Ties is in the cost of installing. Study carefully the figures of comparison. They are conclusive proof of the superiority of

DAYTON MECHANICAL TIES



Excavation for Mechanical Tie

Track Construction

7-in. rail
4½-in. mechanical tie
6 in. x 1 ft. 6 in. for tie foundation
Total excavation for track
11½ in. x 8 ft. 6 in. x 1000ft., = 302 cu.yd.
6 in. x 1 ft. 6 in. x 2000 ft., = 55½ cu.yd.

Excavation for Paving

4-in. paving block
1½-in. sand cushion
6-in. concrete foundation
Total excavation for paving 11½ in. x 8 ft. 6 in. x 1000 ft. = 302 cu.yd.

Excavation Below Paving Line 55½ yd.

Cost

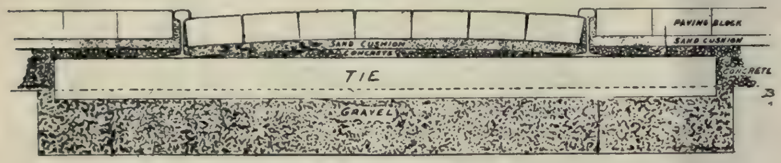
3-ft. centers

55½ cu.yd. excavation,	$1.25	$69.88
300 track ties	2.50	750.00
33 joint ties	5.75	189.75
55½ cu.yd. concrete	6.00	333.00
Labor		48.00
		$1390.63

$1.39 per foot

The figure of $48 for labor is the actual experience o h D. S. & X S. Ry. Co. in laying track with labor 30 cents an hour.

WOOD TIES IN GRAVEL BALLAST



Excavation for Wood Tie

Track Construction

7 in. Rail
6 in. Tie
8 in. Ballast
Total Excavation For Track:
21 in. x 8½ ft. x 1000 ft. =
551 cu.yd.

Excavation For Paving

4 in. Paving Block
1½ in. Sand Cushion
6 in. Concrete Foundation
Total Excavation for Paving,
11½ in. x 8 ft. 6 in. x 1000 ft =
302 cu.yd.

Excavation Below Paving Line 249 Cu. Yd.

Cost

2-in. centers

249 cu.yd. Excav.	$1.25	$311.25
249 cu.yd. Ballast	1.50	373.50
500 W.O. Ties	1.25	625.00
6 Kegs Spikes	8.00	48.00
Labor		350.00
		1707.95

$1.707 per foot.

Labor of $350.00 includes laying track, spiking, gauging, aligning and surfacing at 35 cents per foot of track.

Installing Wood Ties	$1.70 per foot
Installing Mechanical Ties	$1.39 per foot
Mechanical Ties Save	41c per foot

A saving of nearly 25%—by using Mechanical Ties.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy.

WRITE TODAY

DMT Co

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO

DMT Co

Northern White Cedar Poles

View No. 1—**Northern White Cedar Poles** on Kedzie Avenue, Chicago. These poles have carried heavy loads many years.

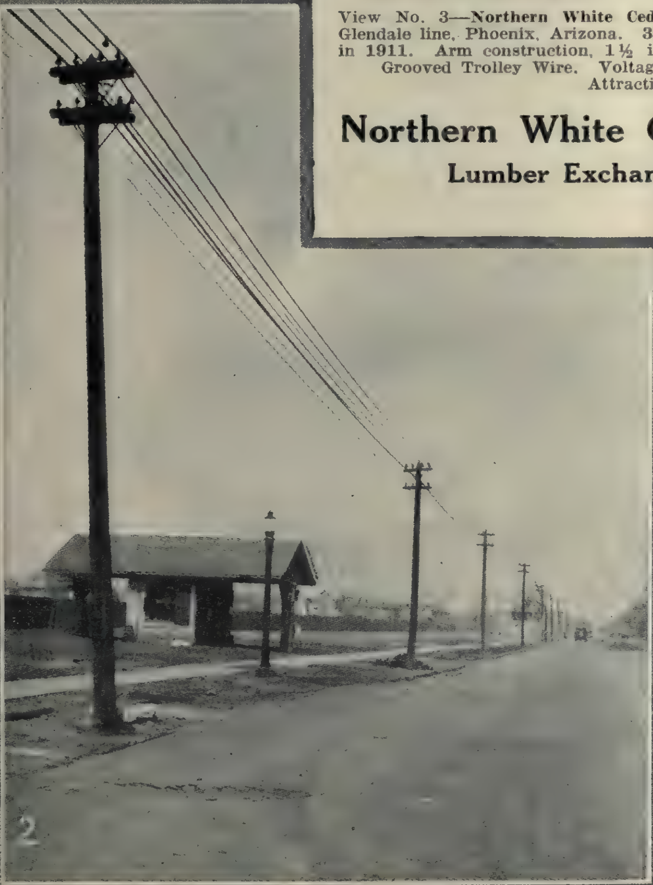
View No. 2—**Northern White Cedar Poles,** 30 foot, near Ford Auto Factory, Detroit, Michigan. They carry

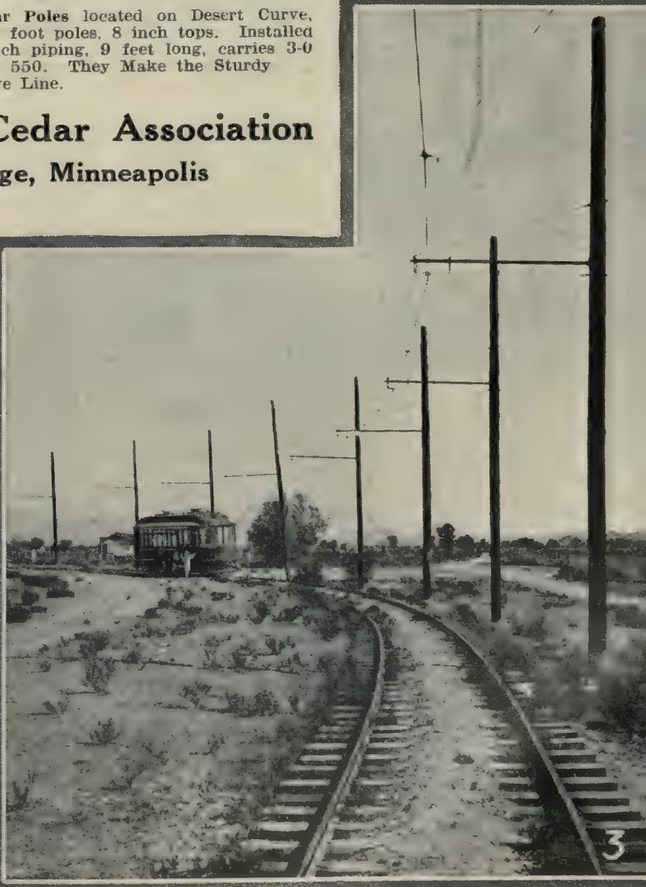
1,000,000 C.M.W. P.T.B. Cable: 4—500,000 C.M. P.T.B. Cable: 4—No. 9 W.P. Iron Wires. This line has been in service 10 years.

View No. 3—**Northern White Cedar Poles** located on Desert Curve, Glendale line, Phoenix, Arizona. 35 foot poles, 8 inch tops. Installed in 1911. Arm construction, 1½ inch piping, 9 feet long, carries 3-0 Grooved Trolley Wire. Voltage 550. They Make the Sturdy Attractive Line.

Northern White Cedar Association

Lumber Exchange, Minneapolis





Important to the Public!

The Destructive Postal "Zone" Law

ENEMIES of magazines and magazine reading are now claiming that the heavier postage increases of 100 to 900 per cent. in the destructive postal "zone" law falls only on the advertising pages and that the 50 per cent increase is merely upon the reading pages, therefore readers are not affected! **This is false in fact and principle.**

As a magazine cannot be separated from its advertising —adverising which makes possible in its quality and quantity —this claim is fallacious and the postage increase must fall upon the readers of magazines **for the entire magazine,** *no matter how deceptively it may be described and separated by the enemies of magazines and magazine readers.*

Do not be misled by the absurd camouflage that the destructive postal "zone" system affects only the advertising pages—**because the "zone" postage must be paid under the postal law for the entire magazine which you read.**

The advertising pages are part of each copy. These terrific postage increases of from 50 to 900 per cent. are imbedded in each copy—depending upon the accidental remoteness of each reader—and necessarily apply, therefore, to each and every copy.

And the reckless efforts to disguise obviously unjust postage "zone" charges are plainly evidenced by the futile arguments of those who established the postal "zone" system—a "zone" system utterly condemned over fifty years ago when it was abolished by Abraham Lincoln.

An Aid to Pro-German Propaganda

Congress last year enacted this hasty but permanent postal legislation, despite the fact that it had been twice rejected by the United States Senate and also unequivocally condemned by the latest official United States Postal Commissions. This postal "zone" legislation reversed postal history. This postal zone law, moreover, has been condemned by Ambassador Gerard, who earnestly said it was a law that would **aid pro-German propaganda.**

The Hon. Charles E. Hughes headed the latest official United States Postal Commission, when he was Justice of the United States Supreme Court, and which reported emphatically against the postal "zone" system; and further emphasis is lent to this "zone" system condemnation by the statement of Charles E. Hughes himself, on June 27th of this year, 1918, in which he again states that this postal "zone" law **"is decidedly a looking-backward and walking-backward measure" in postal history!**

Magazines are sold to the reader at less than their cost of manufacture—the only manufactured product in the world of which this is true. Magazines are enabled to do this by reason of the revenue from advertising pages; and the increase of from 50 to 900 per cent. postage on the advertising pages simply means that in that particular copy of the magazine are imbedded all of these postage increases running from 50 to 900 per cent. falling, chiefly, with terrific postal increases in the West.

The Functions of Advertising

President Wilson explains the function of advertising in relation to readers and the public, for he said when Governor of New Jersey:

> "It must be that those who are proposing this change of rates do not comprehend the effect it would have. **A tax upon the business of the more widely circulated magazines and periodicals would be a tax upon their means of living and performing their functions.**
>
> **"They obtain their circulation by their direct appeal to the popular thought. Their circulation attracts advertisers. Their advertisements enable them to pay their writers and to enlarge their enterprise and influence.**
>
> "This proposed new postal rate would be a direct tax, and a very serious one, upon the formation and expression of opinion—its more deliberate formation and expression just at a time when opinion is concerning itself actively and effectively with the deepest problems of our politics and our social life.
>
> "To make such a change now, whatever its intentions in the minds of those who propose it, would be to attack and embarrass the free processes of opinion. Surely sober second thought will prevent any such mischievous blunder."

Discriminates Unfairly Against Readers In Different States

This discredited and reactionary postal "zone" system now resurrected in the face of a storm of protests from the ablest minds in our country, discriminates unfairly against readers in different states by reason of their accidental remoteness from the city of publication. Readers in Eastern and Northern states will pay less postage under this postal "zone" law than readers in Western states, **and for exactly the same magazines!**

REMEMBER—THERE IS NO POSTAL DEFICIT; LAST YEAR THERE WAS OVER $12,000,000 SURPLUS!

Write to your Congressman in protest against the law and do it NOW! And if you will assist by another occasional letter or argument with a friend send your name to Charles Johnson Post, 200 Fifth Ave., New York City.

Write to your Congressman at once!

DO IT NOW!

PETITION TO CONGRESS - Sign Here!

The spread of education, of culture, of scientific knowledge and advancement, and of our vast internal merchandising and manufacturing has been, and always is, vitally dependent upon the freest and cheapest circulation of periodicals. The penalties resulting from any restriction on the freest possible circulation of periodicals will be destructive of the best interests of our economic life and the opportunities of developing our best citizenship.

The postal amendment passed by the last Congress, increasing the postage on periodicals from FIFTY to NINE HUNDRED PER CENT. with its postal "zone" system, will throttle or destroy our periodicals at a time when, the widest and most extensive circulation of publications is essential to the patriotism, education and upbuilding of our country.

Therefore, I, the undersigned, do most earnestly demand the repeal of this burdensome periodical postage amendment.

Name..

City or County..

Street Address..

State...

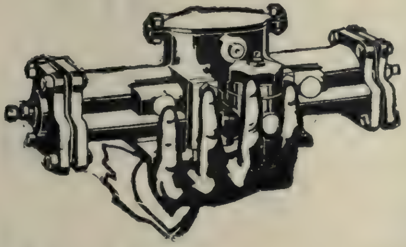
Periodicals mean much in your life. If you will help by a few arguments with your acquaintances and an occasional letter to your Congressman in a spare moment, put a cross mark here

→ ***Will you help in securing the repeal of this iniquitous law?*** ☐

CUT OUT. MAIL TO CHARLES JOHNSON POST
Room 1417, 200 FIFTH AVE., NEW YORK CITY

IT'S EASIER TO GET

This



and This

Than

This

Do not allow the shortage of men to embarrass your service to the public when the equipment of your cars with National Pneumatic Door and Step Control—by removing the curse of manual labor from the rear platform—will enable you to

Employ Women or Older Men

Hundreds of women are already in successful satisfactory service on cars so equipped. They will make good on *your* cars too if you will give them the opportunity to use the same equipment. Why not arrange to install National Pneumatic Door and Step Control before the 18 to 45 draft begins to affect your platform personnel?

NATIONAL PNEUMATIC COMPANY INC.

50 Church St. New York

515 Laflin St. Chicago

Around the Continent with Hale and Kilburn at Charleston

Original Hale and Kilburn Rattan Still Serviceable After 21 Years

During the year the Charleston, S. C., Consolidated Railway and Lighting Company is going to retire sixteen single truck cars which have been in service since 1897.

These cars were fitted at the time with Hale and Kilburn seats; and during the many years that they have been used since not one seat or back covering has been replaced.

Doesn't this bear out all we have asserted for the pliability and durability of Hale and Kilburn twill-weave rattan?

No marvel then that confidence in Hale and Kilburn quality has led the company to specify the

No. 300 A
For Sixteen Cars for Train Operation

This user knows that Hale and Kilburn seating will make good fromhis own experience.

Hale and Kilburn Corp.

Philadelphia
Washington
Detroit

New York
Atlanta
Chicago

San Francisco
Louisville
St. Louis

An officer on board a warship was drilling his men.

"I want every man to lie on his back, put his legs in the air, and move them as if he were riding a bicycle," he explained. "Now commence."

After a short effort, one of the men stopped.

"Why have you stopped, Murphy?" asked the officer

"If ye plaze, sir," was the answer, "Oi'm coasting."—*Pittsburgh Chronicle-Telegraph.*

Murphy Had the Right Idea

Before the war he had evidently been a motorman operating trolley cars equipped with Arthur Power-Saving Recorders.

He believed in shutting off the power as soon as possible.

And that is the idea which your motormen will get and keep when they constantly have before their eyes an

THE ARTHUR POWER-SAVING RECORDER
POWER-ON PERIOD 6574
7695
MADE IN NEW HAVEN CONN. U.S.A.

"It behooves you to Hooverize your motormen"

Arthur Power-Saving Recorder

with its continuous record of "power on" time.

A power saving campaign utilizing the Arthur Recorder pays big dividends to the electric railway company in saving of coal—saving of brakeshoes and other car equipment—safety of operation.

The Arthur Power-Saving Recorder Company
Second National Bank Building, New Haven, Conn.

Hello!

this is* LIBERTY *speaking

HELLO!
THIS IS LIBERTY SPEAKING—
BILLIONS OF DOLLARS ARE NEEDED
AND NEEDED NOW

Exact size of label

Put LIBERTY on the wire by putting small gummed colored stickers of this Fourth Liberty Loan Poster on all your business letters.

LIBERTY needs billions
you can help her get them

THE COLORED INSERT found in this issue is an appeal which we have transformed into small gummed colored stickers (faithful reproductions of the original) and which will be used on the face of every letter mailed by the McGraw-Hill Company, Inc., during the period covered by the Fourth Liberty Loan campaign.

Believing that *you* might like to adopt the same plan and connect LIBERTY with those to whom you write, we have made ample provision for supplying readers of the McGraw-Hill publications with as many stickers as they can use at the following prices:

$3.00 per 1000 50c. per 100

THE STICKERS are just as striking as the insert, and every sticker tabbed on a letter puts LIBERTY on the wire.

If you wish to be supplied let us know your requirements promptly.

When sending in your order please address

Liberty Loan Bureau, McGraw-Hill Co., Inc., 10th Ave. at 36th St., N. Y.

The Plant Behind the Product—A view of the forge and heat treating departments of the Valley Works at East St. Louis, Ill.—the home of "Electroheat" Axles.

"Electroheat" AXLES

—heat treated with "Laboratory Accuracy"

Scientific certainty attends the manufacture of "Electroheat Axles."

From the making of the steel in the open-hearth furnace to the various steps of forging and machining "Electroheat" Axles pass through skillfully trained hands—every operation is performed by men who know. But it is the vital final operation of *heat treatment* that stands out as a new achievement in axle making. Here almost *laboratory accuracy* is attained!

By "laboratory accuracy" in heat treatment is meant the wonderful precision exercised in heating these axles for annealing, quenching or tempering; for herein lies the only means of obtaining absolute *uniformity* in manufacture and the *exact* physical properties essential to maximum safety and service.

The heating of "Electroheat" Axles by electric furnace makes possible this "laboratory accuracy" in manufacture. And when Laclede engineers applied the "Electric Way" to axle manufacturing they developed a process that insures not only *better* axles—but better axles in quantity by reason of the *uniformity* which it makes possible.

Safety, Service, Satisfaction — that's what you buy in "Electroheat" Axles. Use is the test!

Note: "Electroheat" Armature shafts possess the same torsional and shock-resisting qualities as "Electroheat" Axles, being heat treated by the same process. They minimize service breakdowns and maintenance costs.

LOOK FOR VALSCO ON EVERY AXLE

"If Heat-Treated Electrically—It's a VALSCO"

LACLEDE STEEL COMPANY

General Offices—Federal Reserve Bank Building

SAINT LOUIS, MO., U. S. A.

Saving Coal With Cambric

For every kw.-hr. of power used you must burn a definite amount of coal. Every joint poorly insulated means wasted power, wasted coal and wasted earnings.

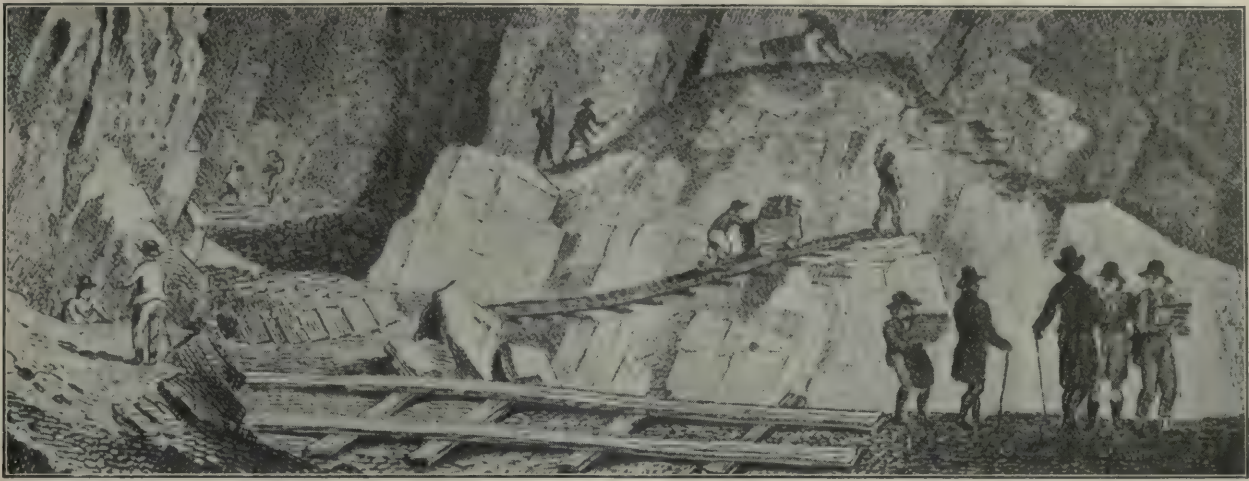
Insulate motors, coils, armatures and other equipment properly by always using

Irvington Black Varnished Cambric

Time Proves Its Superiority

Black and Yellow Varnished Cambric
Black and Yellow Bias Cambric Tape
Oiled Silks Oiled Papers
Black and Yellow Insulating Varnishes
Black and Yellow Flexible Varnished Tubing

IRVINGTON VARNISH & INSULATOR Co.
Irvington, New Jersey.



Railways had their origin in tramways or wooden wagonways used in the sixteenth century for conveying coal near Newcastle, England. In time the wooden rails were covered with a thin sheet of iron. Iron wheels were introduced about 1734 and the first cast-iron rail appeared about 1767.

The Rapid Progress Made in Transportation

is instantly suggested by the picture of this old tramway. One hundred and fifty years elapsed between the time this crude equipment was used and the date of the inauguration of the first American electric railway.

It is a period of only about 30 years from the date of the first electric car in America to the comfortable, high-speed, efficient electric car of today.

Naturally this rapid progress in modern methods would not have been possible without concurrent progress in every department of the railway business.

Greater speed, increased weight of equipment, longer runs and other factors have naturally created a need for more efficient lubrication.

Galena Oils

and the service that goes with them have met this need throughout the whole period of modern railway development.

Galena methods have never stood still. They have always improved.

Galena-Signal Oil Co.

Franklin, Pa.

"Persist in Your Advertising"

This in brief is the message from Hon. William B. Colver
Chairman Federal Trade Commission

To relax now is to invite bitter competition later

Excerpts from an article by Hon. William B. Colver in *Editor and Publisher,* Aug. 24, 1918.

DISCONTINUANCE or even sharp curtailment of advertising because of temporary war conditions, would seem to imperil the most valuable asset that any business has—namely, **its good-will.** No more faulty logic can be found than that which would impel a manufacturer to cease building for the future by means of advertising simply because the output of his factory is, for the time being, restricted; or because diversion of his facilities to war work has operated to withhold his goods from accustomed markets. In modern business there can be no sufficient-unto-the-day policy.

In advertising the business man has built up the intangible or spiritual side of his business, if such it may be designated, as distinct from the material side. It is the spiritual side, as represented by good-will, that is slower of growth and that is **the more seriously jeopardized by neglect**—neglect which could take no more disastrous form than an interruption to advertising.

Good-will, in my estimation, is far more valuable than the physical property with which it is linked.

Advertising a Capital Charge

In my estimation, only a small part, if any, of advertising expenditure is properly chargeable as a current item of sales expense; but is, rather, when translated into terms of good-will, a permanent investment and hence a capital charge. Given this conviction, it must appear quite as short-sighted to discontinue advertising merely because the war has momentarily interrupted distribution as it would be deemed unwise of a manufacturer to junk a portion of his factory equipment because there had been interruption to its use.

The manufacturer who has converted his factory to war work, and has, therefore, interrupted the production of his original line, does not tear down and discard his expensive machinery to save the insurance premiums or other similar expenses.

Not the least of the considerations, certainly, that argue for the continuance without interruption of the advertising of all concerns that will come back after the war, is that sales are in reality made long in advance of the actual transaction that we commonly refer to as the "sale."

Persistent Advertising is Insurance

There is scant justification, it would seem, for the misgivings of the advertiser who is prone to allow his investment in good-will to go by default merely because he suspects that popular demand or the conditions of distribution may undergo some radical change after the war. If a business man is basing his expectations upon an unworthy product he might as well abandon it once and for all. For the manufacturer, however, who has faith in his product there is every reason to have faith in the future and every incentive to take out insurance in the form of persistent advertising.

An advertiser is justified, in the face of suspended animation, commercially speaking, in **doing everything within his power to sustain his commercial integrity and preserve his commercial identity.** Let the corporation with such an asset use its surplus, employ its undivided profits, or even borrow money to protect, by means of consistent and insistent advertising, that valuable, intangible asset—good-will, **which is the one thing that cannot be bought out of hand after the war.**

ELECTRIC RAILWAY JOURNAL
10th AVE. AT 36th ST., NEW YORK

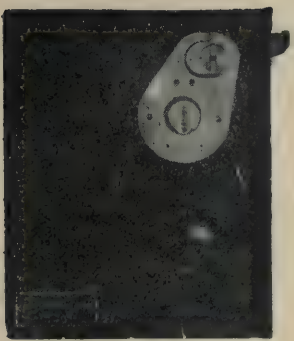
The Newest Motorman Appreciates the Principle of the

Rico Coasting Recorder

*"By giving the trainmen (at Denver) an opportunity to convince themselves that **coasting** is a correct basis for efficiency rating, we secured their **hearty co-operation.***

*"The result is that we are now getting a satisfactory percentage of coasting and excellent economy considering the **large number of new motormen** the war has obliged us to take on;*

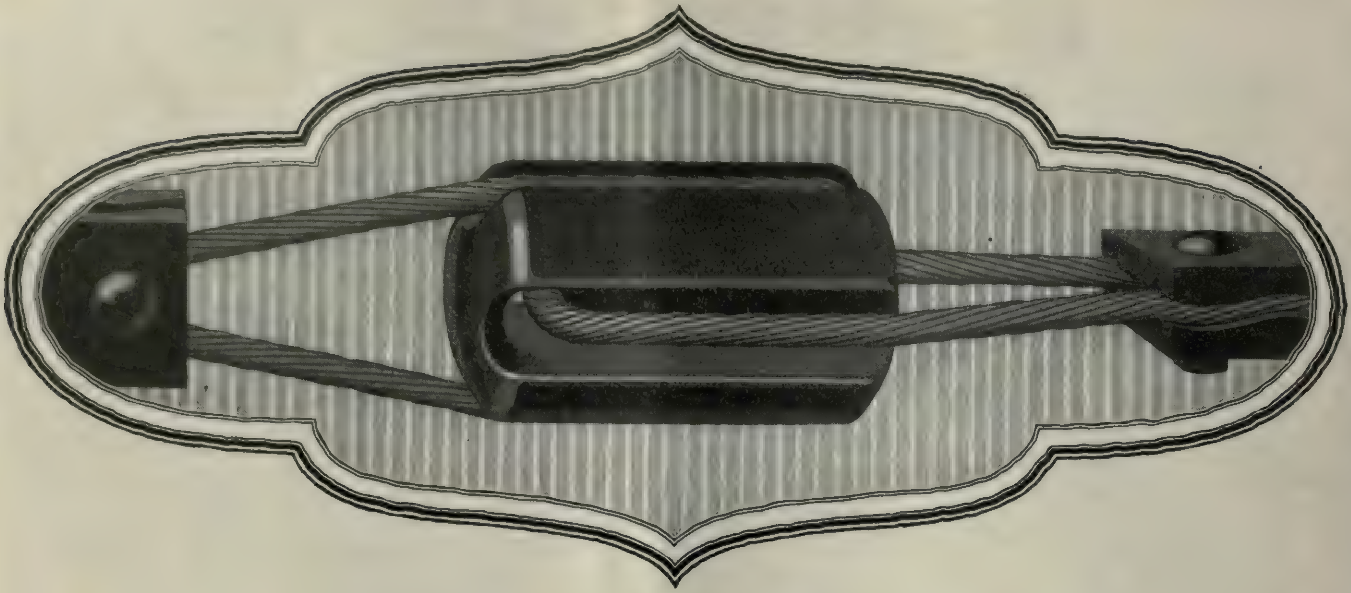
*"And we are getting this with **enthusiasm.**"*



Please note in this extract from H. C. Kendall's article in the Electric Railway Journal for July 13, 1918, that **despite** the rapid turn-over of motormen, the Denver Tramways secures high coasting for the simple reason that even the newest recruit knows that the only way to save power is to lengthen COASTING TIME by shortening accelerating, braking and stopping time. That's why he believes in and works with the Rico Coasting Recorder which automatically **prints** the proof of the motorman's efficiency.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Porcelain Strain Insulators

It pays to buy the best

The outward appearance of a porcelain insulator gives little indication of the care and materials used in its making. Only actual service over a period of time will separate the well-made from inferior insulators.

G-E porcelain insulators are built up from the beginning under the close scrutiny of men long experienced in the art. Especially is extreme care exercised during the vital processes of moulding, drying and firing.

Insulators made in this manner cost more, but because they give real service and longer life they are worth more.

40-25

GENERAL ELECTRIC COMPANY

General Office, Schenectady N.Y. Sales Offices in all large cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, September 21, 1918 *Number 12*

Liberty is Asking for Billions of Dollars

OUR poster this week tells its story. Now is the time, when the enemy is faltering and falling back, to emphasize the determination of America to use "force to the uttermost" to settle the questions involved in the war, since this is the only kind of argument which the Hun understands. Every electric railway manager should ask himself this coming week: "Is my organization prepared in the best possible way to assist all of its employees to subscribe to Liberty bonds?" Every individual should raise the question in his own mind: "How large a subscription can I make to help bring this war to a victorious conclusion?" The poster which accompanies this issue has been drawn especially for the McGraw-Hill Company by the same artist who was responsible for our previous war posters. We suggest that each subscriber put it up in some place where in his opinion it will do the most good.

Government Gives Car Standardization a Boost

THE announcement last week that at the request of the United States Housing Corporation a number of car design experts are getting their heads together to evolve a design of car which can be used in locations in which the corporation is interested deserves more than passing notice. It is a step, although possibly but a short one, in the direction of ultimate general standardization.

The impelling reasons for standardization in this case, however, are different from those which are effective in normal times. Ordinarily the arguments which are germane are that standard cars ought to be cheaper than others, and that it should be possible to procure them more promptly because the manufacturing operations are standardized and the parts can be kept in stock. In the present instance the government is purchasing cars, directly or indirectly, on large scale. These are for the transportation of war industry workers. They may or may not be needed at the close of the war on the properties now operating them. These cars should, therefore, be of such a type or of such types as readily to be available for use on other properties.

Regardless of the purpose of the present proposed standardization, however, such standardization cannot but be of value to the industry as an object lesson. It will, if successful, indicate what could be done on a larger scale if the necessary centripetal force could be brought into action. There is too much individuality still in car design, but the tendency is to swing away from it. We cannot afford it. At the same time it would not be safe to ignore the importance of keeping the inventive talent stimulated. There must be a "happy medium" between stagnation and non-essential variation. The Housing Corporation's committee may help us in finding this.

Save Paper and Gas the Hun

THE War Industries Board has issued an urgent call to this country to economize in the use of paper. All magazines, including the ELECTRIC RAILWAY JOURNAL, have been instructed to reduce their consumption of paper 10 per cent as compared with last year but with no guarantee of adequate supply under the reduced tonnage. The War Industries Board has also formulated a number of regulations designed to promote economy in the use of paper by magazines, such as discontinuing exchange and complimentary copies of the paper, stopping all subscriptions promptly at the date of expiration unless the subscriptions are renewed and paid for, and other rules. All of these regulations this paper is pledged to carry out and it is glad to do so. But it believes that by the arrangements which it has made it can fulfill all these rules without impairing in any way the service which it is giving to the electric railway industry.

Economy in the consumption of paper is desired for many reasons. In the first place, paper making requires a large amount of fuel, labor, capital and transportation space, all of which can be used for war purposes. Paper manufacture also requires chemicals, notably sulphur in the form of SO_2, and there should be no shortage of sulphur because it is used in great quantities in the manufacture of war munitions, especially of poisonous gas. Hence, economy in paper will help this country to carry on its gas warfare against the Germans and thus turn their original invention against themselves.

But magazines and newspapers are not the only consumers of paper. It is being used far more extensively than ever before by all of the government departments in the form of stationary, posters, and boxes for shipments of munitions, foodstuffs and other supplies over seas. It is important for all users of paper, whether publishers or others, to keep all paper waste to a minimum Electric railway companies may not be as great consumers of paper as many other corporations, yet they also should see what they can do to limit the amount actually used and to conserve the paper not actually employed by seeing that it is sold to the junkman and thus made available for reuse. Perhaps the most extensive use of paper by electric railway companies is for transfer tickets. On the largest properties the number of transfer tickets printed for each day's use runs into the millions, but of this number only a portion are actually issued. Paper is going to be more expensive in the future even than now, so that each company has a material object in reducing waste as well as a patriotic motive to help the rest of the country. Examination should be made also to determine whether all of the forms employed in tabulating operating records are necessary. There may be a chance here for economy as well as in the use of stationary by single spacing typewritten letters, using both sides of the paper for carbon copies and in other ways.

Let the slogan be "Save waste paper but don't waste paper."

High Rentals Do Not Mean An Excessive Rate of Return

COMMISSIONS, like individuals, are human, and consequently they sometimes say and do strange but excusable things. In general, however, regulation has reached such a state of development that it is extremely difficult to excuse any evidences of a misunderstanding or lack of understanding as to simple fundamentals.

We are led to enter upon this discussion by the following remarks of the Board of Public Utility Commissioners of New Jersey in its recent decision covering the Public Service Railway fare case:

> Should, in future proceedings, an investigation be made to ascertain the fair value of the property and the return received by the petitioner, undoubtedly the underlying leases under which the petitioner operates will be and should be carefully analyzed and the rentals paid thereunder investigated, for in ascertaining the fair return upon the property not only would the return received from the rates of fare as at present charged be pertinent, but it should also be determined whether the fixed charges are excessive.

Zounds—words almost fail us! Why must fixed charges be considered in connection with the determination of a fair return? Courts and commissions without number have ruled that a utility is entitled to charge rates sufficient to pay a fair return upon property used and useful in the public service. Once a fair valuation is made—which the New Jersey commission presupposes —fixed charges or any phases of corporate capitalization have nothing to do with the determination of a fair return by the commission.

The reasons are so simple that it seems a waste of time to state them, but apparently it must be done. The Public Service Commission for the Second District of New York in the recently decided fare case of the United Traction Company had the basic point in mind when it remarked: "It makes no difference in fixing rates whether a road was built with the proceeds of bonds or altogether by the sale of capital stock." It might with equal truth have added: "or whether it is operated under lease or directly by the owner." For if a fair return is allowed on the value of the used and useful property, it is none of a commission's concern whether this return goes to many bondholders and few stockholders, or to few bondholders and many stockholders, or mostly to lessors and little to security holders.

Property operated under a long-term lease is valued along with property built by means of money from stocks and bonds. Perhaps the rental is high, in the light of present utility conditions, but that has no bearing upon a fair return on the property as a whole. If the lessors are receiving too much and security holders too little, that is a problem for the company and its owners to work out. For a commission to interfere in the internal affairs of a utility and refuse a fair return on the property because of believed inequities in the corporate financial structure would be a lamentable usurpation of authority.

But suppose no detailed valuation is made and the commission is considering the grant of emergency rates. Should the fixed charges then be scrutinized? Yes, but two cautioning remarks should be made. First, if the bondholders seem to have received a high return; if the lessors seem to have been likewise favored—these facts mean nothing by themselves. The vital point is this —have all the security holders combined been receiving too high a return on a reasonable estimate of the value of the utility property? Second, if the utility has presented an appraisal estimate by a competent engineer, a commission has no moral right to disregard it utterly. It should be willing to accept every reasonable indication of utility value and grant provisional relief pending later examination, if such is needed.

The public does not yet understand the simple basis of rate-making. Hence, when it hears tales of leases with high rentals, it jumps to the conclusion that it is being robbed. It can be taught differently in time, but the work would be easier if regulatory bodies did not sometimes do such muddled thinking.

Every Shop a Reclamation Shop—But Not a Factory

IN THESE TIMES of shortage and expensiveness of materials needed in the electric railway maintenance shop it is no wonder that reclamation work is more conspicuous than in normal times. Some things must be done now that might not have been economical before. At any rate, every master mechanic in these days is lying awake o'nights in order to scheme out ways of making existing equipment and supplies go as far as possible.

In the issue of this paper for Aug. 31 there appeared an account of a centralization of reclamation work which had been brought about on the property of the Connecticut Company. The principles involved in the plan were not novel, but the ways in which they were applied in this case were interesting and suggestive. On every live property, large and small, something of the same kind is going on. The principal lesson from the Connecticut Company's experience, it seems to us, is the importance of developing what might be termed "reclamation specialists" who can apply, to the local work in hand, the best reclamation methods which are available to him.

There is plenty for a reclamation specialist to do in keeping up with the very rapid progress in this work in all fields. He can learn from manufacturers as well as from maintenance men, from shipbuilders, from locomotive repair shop men. Take, for example, this matter of gas and electric welding and cutting. What a world of progress has been made in the past few years! "There is nothing new under the sun," at least very little, in this field as in others, yet it has taken the present crisis and the conditions immediately preceding it to get engineers really to appreciate what could be done with this form of concentrated heat. Now any master mechanic will tell you that it is a "life saver" for him.

At the moment unusually rapid progress is being made in this art under government stimulus, and some one in every electric railway shop organization ought to be keeping up with it. The technical papers of all countries are full of the subject, and there has just been published by the Emergency Fleet Corporation an elaborate report on electric welding, under the auspices of its electric welding committee. This report covers resistances, spot and arc welding.

Welding has been mentioned specifically as an illustration of reclamation work, but it is only one of several means at hand to the reclamation specialist. Nothing will reflect greater credit upon the master mechanic on any property than the effective use of all of these means for saving something.

But right here we feel impelled to suggest another but kindred line of thought, namely, that a maintenance shop should not also be a factory. There is a great and apparently an increasing tendency on the part of mechanical departments to manufacture things. Now there is a danger here that we shall fall into the pernicious practice of the jitney—to take off some of the cream of the manufacturing business, leaving skim milk to the legitimate manufacturer. We do not refer to the making of patented articles, a practice which is beneath the dignity or the principles of a railway company, although occasionally indulged in. We have in mind the making of supplies in a field well covered by responsible makers of equipment.

This paper has always stood for any shop practice which is for the long-run good of the electric railway. It is for this good that we condemn competition with manufacturers where these are satisfied with a reasonable profit, considering all proper charges. Such charges include allowances for development work, fixed charges, selling cost and something for the manufacturer himself. Company bookkeeping in this regard is apt to be like municipal bookkeeping in connection with utility operation, namely, in the ignoring of charges which are really part of the manufacturing cost. Where a railway company, which is not organized for manufacturing and can do so on only a small scale, estimates that it can manufacture supplies, all things considered, cheaper than a manufacturer who is organized for just that work can sell those same articles, the chances are that something is wrong with the estimate. In such a case we advise the company to search diligently for bookkeeping entries in which some "overhead" has been omitted.

But even if some articles can be made for less than they really cost to buy in finished form, it is a fair question as to whether it is even then the best policy to make them, unless an extortionate price is asked. Manufacturers who enjoy a good trade with a company on a variety of articles on which a reasonable profit is made are more apt to put themselves out to supply some special demand of that company, if one should be made, than if the railway came to them only when it had a favor to ask.

Nearly Time to Shift the Clock Hands Back an Hour

LITTLE more than a month remains of the operati of the "daylight-saving" law. On Sunday, Oct. 2 the clocks which were turned ahead one hour on Mar 31 last will be set back and Mr. Average Citizen ca stretch his limbs for sixty minutes longer in the mor ing and gradually get back into the habit of turnir in an hour later at night.

This measure, passed after long debate in Congres has undoubtedly been very effective in conserving t health, wealth and mineral resources of the natio While no dependable figures are available on the tot fuel saving resulting therefrom, it has been estimat that this law will have been responsible for the co servation of from 1,000,000 to 1,500,000 tons of co during the seven months of its operation. Electric ra ways have had some of the benefit of this economic measure, and the people as a whole probably ha profited to an unappreciated degree by the enjoyme of extra leisure during daylight hours.

The fundamental principle or purpose of the da light-saving plan is to synchronize the period of wo with the rising of the sun rather than with the tin (noon) when the sun reaches its meridian, so th during the summer when the days are long, the peri of recreation after work can be taken while there natural light rather than during a time of artifici light. As the sun rises some three hours earlier in Ju than in December in the latitude of New York, t present plan, in which work is begun only one ho earlier in summer than it is in winter, does not ful make up for this variation in the time of sunrise. Ho ever, it does so to some extent, and as well as cou be done with any system involving only two changes time, one in the spring and the other in the autum

The suggestion has been made by some enthusias for the present daylight-saving plan that it should b continued throughout the year. They believe that pe ple are now so accustomed to rising an hour earli than they otherwise would that they would contin cheerfully to do so during the winter. These advocat however, overlook the fact that such a plan would r quire most people to get up a considerable time befo sunrise. They would thus have to use artificial lig in the morning instead of in the evening so that the would be no saving. Moreover, such a measure wou be very unpopular because while most people do n object to sitting up in the evening with artificial lig they do object to being obliged to use it after risin in the morning. We are afraid that if the plan we followed throughout the year the tendency in wint would be gradually to delay the times for beginning an ending work, and the hours being thus fixed for winte conditions could not easily be changed back during th summer.

Another point worth mentioning, a psychological one is that if people used much light in the morning the would forget to turn off this light until some time afte the necessity for it had ceased. They could not be ex pected to keep the matter constantly on their minds hence another incidental advantage and economy i shifting the clock hands back to their normal place i the winter time.

Some Practical Points in Pole and Tower Erection and Support

By Charles R. Harte

Construction Engineer The Connecticut Company, New Haven, Conn.

These Points Have Particular Reference to Erection in Marshy Ground and Also Cover the Procedure in Raising Steel Towers of Different Types

IN THE cases of pole settings described in a previous article it has been assumed that the soil is of reasonable bearing capacity, at least ½ ton per square foot. It is generally a very good investment to go around any area of softer ground that cannot be "jumped" by a long span. When, however, the difficulty must be met directly, special construction is required.

The simplest plan is to attach the poles to a trestle or bridge, but frequently there "is no such animal," and where there is one, if it is owned by other parties there is often refusal to permit its use, or a prohibitory rental is demanded. If the structure and the line are built at the same time, as is often the case where they are for the same property, it is a simple matter to provide for the pole attachment, but if the structure already exists it may be difficult to get clearance. Sometimes this latter is effected by leaning the poles outward. With pin insulators this tends to lower the wet weather resistance; with suspensions it may necessitate special construction to maintain the normal clearance.

Setting Poles in Soft Ground

When the line must stand on its own feet the treatment depends primarily on the character of the soft ground to be crossed. With open water, or in a swamp of some depth and lacking a firm top, practically the only possible treatment is to use piling, to which the pole is bolted either directly or through some intermediate structure. How to handle the piling is often a very serious question. It is surprising with how light a hammer a pile can be "worried down" into soft material, and with but a few inches of open water a light-draft barge can be rigged up that will serve every purpose. It is of chief importance to give the piles holding power against a pull or push on end, for three piles which sway greatly at a touch, if they have a batter of 3 in. or more to the foot, can be tied together at the tops to form an exceedingly firm support.

Where there are only a few poles to be driven, it is often possible to work them down by setting them in place, loading them as heavily as possible, and then, by means of several lines tied to the top with a man on the other end of each line, rotating the top in a small circle. There are two difficulties to look out for. So long as the motion continues the pile will go down, unless of course it has reached hard bottom other than sand, but if it is allowed to stand for a short time the material settles back and makes further "driving" all but impossible. The other point is the danger of an upset in the early stages if the load is very heavy and the head is pulled much out of plumb. This method can sometimes be used to advantage in the case of soft swamps which cannot be navigated by scows, but on the other hand are too soft to carry the pole on surface supports. Incidentally, it will often permit the putting down a pile or a pole in a sandy bottom under water which would completely resist driving by hammer unless a water jet was used.

Special Treatment Needed on Long Stretches of Marsh

It should, of course, be understood that these treatments are particularly for the cases where the stretches of bad ground are comparatively short, and separated from each other by some distance. If the adverse conditions are extensive the situation will warrant some study and often considerable investment in plant specially designed to meet the case.

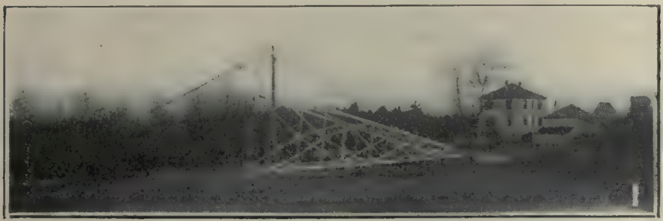
Many swamps have firm bottom overlaid by "mush" of no stability whatever. Single poles rested on this firm base will be perfectly good against the load so long as they stand plumb, but unless their penetration into the hard material is practically to the depth which would be given in setting them on dry land, or other preventive treatment is given, they are very apt to sway badly in the wind and presently to overturn. Such poles may be steadied by guys, with concrete, stone or metal anchors, in which case the guys must be of such material or so protected as to guard against corrosion.

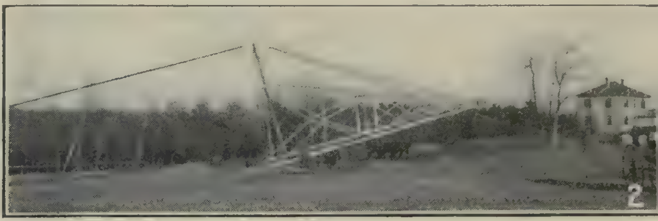
Of higher first cost, but usually much cheaper in the end, is the use at each pole of three piles, battered at least 3 in. to the foot, 120 deg. apart and projecting about 8 ft. above normal water level. At their tops these are bolted to the pole, the butt of which rests on and is bolted to a framework carried by the piles just above water level. An experienced crew finds little difficulty in driving batter piles, though the pile driver may not have been built for such work, but where the men are all green a plumb structure may be used, the piles forming a triangle or square about 12 ft. on a side. In this case the piles should extend roughly one-third of their length above the water and the adjacent ones should be tied together by X-bracing for this length to prevent swaying. The pole may be carried as in the case of the battered triangle, or it may rest on the top platform and have braces from the pile tops to a point near the bottom crossarm.

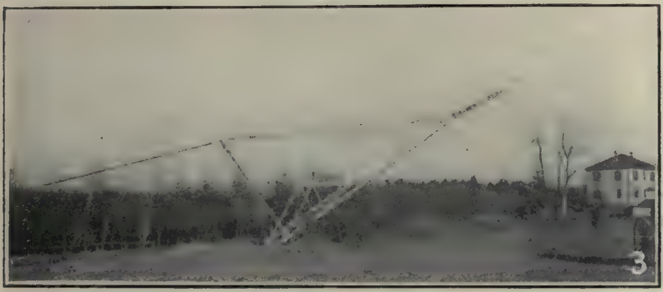
Some Meadows Are Particularly Treacherous

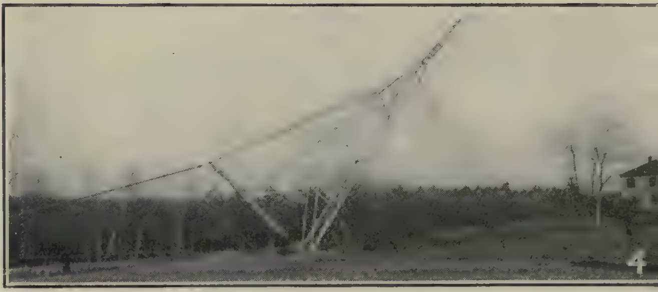
Morasses of the open water type are obviously danger points, and while their treatment may require quite a little study they are not at all likely to be overlooked.

"Cats of entirely different color" are the meadows with a more or less firm top covering all sorts of iniquity. If the crust is thin the treacherous character is fairly evident, but when, as is often the case, the crust is firm to a depth of several feet, it is easy to make the mistake of supposing that the firmness holds all the way down, with consequent later regrets. Swampy character of the surface and the presence of black or brown soil are always a warning to test with a sounding rod. For pole-line purposes a few short lengths of ½-in. iron pipe with a solid point to screw on the end are excellent. With a solid surface 3 ft. or 4 ft. thick, a pair of sections of old pole 8 in. or more in diameter and 8 ft. or 10 ft. long, or their equivalent, (a pair of railroad ties are excellent) bolted through the center to the pole at ground level, will give the necessary additional support. For thinner crusts the bearing area needs to be correspondingly increased. Specifically, the probable maximum dead weight is that of the pole, the attachments and the half spans each side, with the ice load for the district. The area of support must be such as will give a pressure per square foot on the surface covered not over one-fourth the pressure the surface can stand.

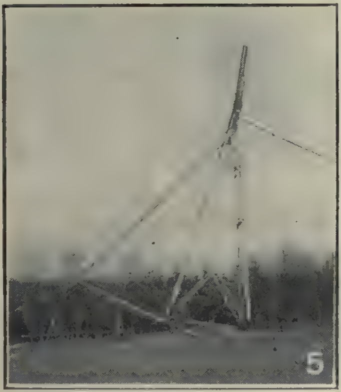








SUCCESSIVE STEPS IN THE ERECTION OF A TRANSMISSION LINE TOWER



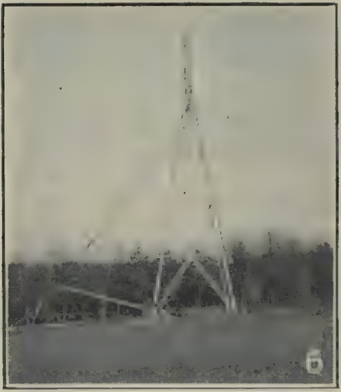


Fig. 1—Ready to start.

Fig. 2—Tower being lifte gin pole acting as a lever.

Fig. 3—Gin pole practica ly at the end of its duty.

Fig. 4—Gin pole pullin away as the attachment a the top gives greater lever age.

Fig. 5—Holding back th top while a man adjusts th foot connections.

Fig. 6—Tower up, foo connections being bolted u

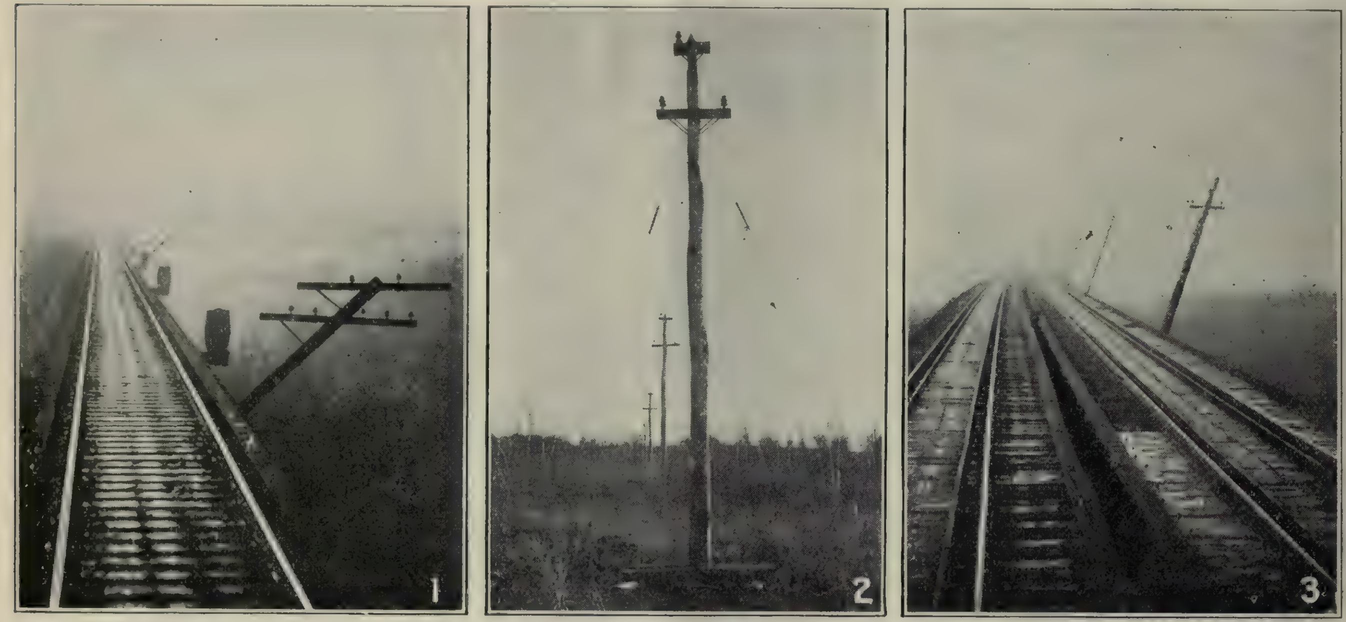
What that pressure may be can be roughly determined by loading a 6-in. x 6-in. stick held vertically by small guys. The weight which forces this through the crust is approximately the pressure allowable per square foot. In making such a test, enough time must be allowed to bring out the facts. Marsh crusts will usually carry for a short period a load much in excess of that which would break through in a longer time. A fair procedure is to add 50 to 100 lb. each time, and to allow three or four days to elapse between successive additional loads. If, however, time does not permit this, daily loads of 200 lb. each will give fair indications, and will be on the safe side.

The purpose of the support arms is particularly t give support to the vertical load, and whenever practicable guys should be used to prevent overturning The crust of a meadow owes its strength very largel to the network of living roots of the plants growin on it and, like a piece of cloth carrying a load, fail badly as soon as any break occurs in the fabric. I support arms are relied upon to take the place of guys the pole, tending to turn at the ground line, throws th entire effort on the end of the arm. This gives pressure which is equal to the bending moment of th pole at the ground line in pound-feet divided by th distance from the pole to the end of the arm in feet (It will be remembered that the bending moment a the ground line is the sum of the resultants of eac element of pressure multiplied by its distance abov the ground line.)

This arm pressure tends to force the end of the arr into the earth, increasing the area pressed, and at th same time to lift the pole bodily, the arm end actin as a fulcrum, until the forces balance. The fulcrur can be given sufficient area to bring the pressure pe square foot within safe limits by putting cross timber or mudsills under the arm ends. But in choosing thes the cross-section must be not only strong enough t transmit the load from the arm to the surface withou breaking when new, but must have a large factor o safety to cover the reduction of strength which is ap to be rapid because of the conditions.

Where the arms are depended upon for cross-lin support, they will usually be 3 in. x 8 in. or larger, i pairs, through-bolted to the pole, which should b slightly flattened to give a good bearing. Paired diagonal braces, 2 in. x 6 in. or heavier, and making an angle of 60 deg. or more with the horizontal, have their tops through-bolted to the slightly flattened sides of the poles. The lower ends go between the arms close to the ends and are there bolted, a block of the proper thickness being used to fill any space left between them. The bottom of the arms should be about 1 ft. or the thickness of the mudsills, if these are used, above the meadow surface, and particularly if arms or braces are less than 4 in. wide filler blocks should be bolted between at intervals of about 5 ft. All parts of these frames, as well as the pole to a point above the upper brace attachment, should have some form of preservative treatment, and particular attention must be given surfaces in contact and to holes or cuts made after treatment, to insure that they are properly closed.

Sometimes 1-in. or 2-in. plank is driven under and at right angles to the mudsills. It is a question, however, if this really protects the bottoms of the mudsills proper from decay, and if the latter are not of uniform thickness they are worse than useless until the uneven pressures are balanced, this generally occurring by breaking the heavily loaded planks.



FIGS. 1 AND 3—POLES ATTACHED TO TRESTLE AND INCLINED OUTWARD TO SECURE STABILITY. FIG. 2—POLE IN SWAMP WITH TIE SUPPORTS AT BASE

In the long run it will almost invariably pay to use piling for the support of the ends of the arms, in which case the latter are framed and through-bolted into the piles. Good results, however, may be had with mudsills, which should be 6 ft. to 8 ft. long, with a vertical thickness of at least as many inches as the length in feet.

Concrete poles in firm soils are set to about the same depth as wood poles, but their weight and the impossibility of using ordinary pike poles practically compels the use of a derrick. In moderately soft earth a concrete footing is used, a plain or reinforced slab of sufficient strength to carry the weight of the pole and its loads being first cast in the bottom of the pole. If practicable, this is allowed to set for at least ten days before the pole is placed on it. The writer has not had personal experience with concrete poles used in very soft ground, but it would seem that conditions which warranted the use of a concrete pole line across such territory would also warrant the use of piles and brackets similar to these for wood poles but in reinforced concrete.

Steps Involved in Putting Up the Steel Tower

Tower erection usually involves three steps; placing the footings, assembling the tower and, finally, erection proper.

The early towers followed windmill practice, and employed masonry or concrete footings extending from below the frost line to at least 6 in. above the surface, and carried anchor bolts by which the tower base plates were held rigidly in place. The top, for an area of that of the base plate, was level with edges beveled to shed water. Footings of this type are still used for anchor and other special towers but require much accuracy in location. For the smaller towers, because of the large *relative* amount of forms and the small amount of concrete, they are very costly. Where they are used a "wrinkle" from steam-engine practice can be borrowed to advantage. Instead of placing concrete close around the bolts, a piece of tin rain leader of diameter 2 in. or 3 in. larger than the bolts, and of proper length to reach to the top of the footing, is slipped over each bolt, resting on the big washer at the bottom. The bolts, with these sleeves centered on them, are then hung from the templates and the footings are poured. The tops of the bolts can then be moved to meet any lack of agreement between tower base and template up to the limits of the large hole in the concrete, which is grouted full after the tower is bolted down.

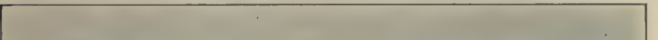
The next step was the substitution for the base plate of the tower and the anchor bolts, of an extension of the tower legs to which the tower proper was spliced. At first this extension was bedded in the heavy form of footing, but very soon the latter was cut down to a sort of mushroom anchor. On at least one good-sized line these were cast in yards and after curing were teamed to the points of use. While this effected a large economy in labor costs it was found that unless the coating was reinforced, in which case the saving was largely lost, it cracked off in handling.

To-day for good soil it is very general practice entirely to omit the concrete. The ground stubs, as they are generally known, consist of about 8 ft. of the section used for the tower leg, with a crossbar about 3 ft. long at right angles to it on the bottom. This stub should be protected with a heavy galvanizing or other treatment, although many are actually set with only the shop coat of paint.

Do Not Neglect Proper Refilling of Foundation Holes

It is essential that the refilling be of good material, preferably with some heavy pieces of rock on top of the crossbar, and if the setting is carefully done no difficulty need be feared. There occurred, however, a very costly failure on a Western line as a result of poor judgment of material. The line in question crossed a flat valley having a soil which, while very hard when dry, lost all strength when wet. The holes, dug in dry weather, were blasted out, and the hard lumps were used as filling without ramming. When a little later a heavy rain flooded this low land, the lumps melted down like soaked sugar, and a long stretch of line went down, tower after tower, merely from the pull of the conductors.

Pre-cast foundations and ground stubs are usually set by template. One of the best forms consist of a square or rectangle, having at its corners short sections of the same angle as is used for the tower legs and at the same inclination, together with a pair of rods or pipes in clamps. The angle sections are drilled as are the tower legs, and extend such a distance below the sides of the rectangle that the tops of the sides are an even number of feet below the lowest conductor, while from diagonal braces is hung a plumb bob at the center. The template is centered on the tower center by the bob, squared with the line by center marks on the two sides, leveled at the proper height and supported on the adjustable rods. The template shown in an accompanying cut has pointed rods, which have to be well driven to prevent later settlement. A flat foot about 6 in. square is better but, of course, in such case care must be taken that the material beneath is reasonably firm and that any moss, leaves or the like have been removed. Incidentally, flat-footed supports readily permit the recentering and relining which is almost invariably necessary after leveling up. The footings are now bolted to the template legs, the holes for them having been dug before the template was set. The holes are then filled in and tamped, keeping the refill at about the same stage in each hole and working completely and uniformly around the stubs to avoid springing them out of place.



TEMPLATE FOR SETTING TOWER FOOTINGS
Note paired support at each leg, now lifted, on which the template is adjusted before the footings are set

PRE-CAST MUSHROOM TYPE FOOTINGS
Note how the concrete has broken off in handling

By having the sides of two overlapping parts suitably drilled, the size of the rectangle can be adjusted for a very considerable range of tower heights, while the substitution of leg sections with base plates properly drilled makes it available for such foundations. In the best form of base plate the anchor bolt passes through the base plate proper and extends up through a second plate or bracket nearly a foot above, thus obviating the tendency to bend the bolt in the threaded portion, and this long bearing in the template holds the bolt against displacement as the concrete is poured. If the base is of the older type, in which the bolt extends only 2 in. or 3 in. above the top of the concrete, it will pay to have temporary extensions, readily made from heavy pipe, to screw onto the bolts, and fitting in guides on the template to hold them firmly in place. As they are vertical, they can hang from the template without such control and if sufficient care is taken there will be no trouble. With the bolt firmly held, however, displacement is practically impossible except by deliberate intent, and the insurance is well worth the trouble.

Towers Are Usually Tipped Up Into Place Complete

Although there is pretty wide diversity in tower design, the shipment, assembly and erection of the types differs comparatively little. The flexible forms are usually shipped complete, and rigid types are shipped knocked down, the parts for each tower together. Bolts and small parts are bagged; other members are tied in bundles. Each bag or bundle is marked with the tower number and the nature of its pieces, and each piece with its erection mark. It is therefore a simple matter for the checker to make sure that, barring a shortage of parts in a bundle, all the material for any tower is on the ground.

The assembly gang, following the men setting foundations, usually set up opposite sides flat on the ground. They first lay out the two adjacent legs the distance apart they will be and at the angle they will make when assembled, with the bottoms close to the foundations, then set the other leg of each side and finally put in the diagonal. In the case of those towers which, like the Milliken, have legs which are pyramids, the entire half tower can be so erected. With towers having long connections from leg to leg only the sides are first set up. The parts are then turned on edge and the assembly is completed. Moderately high towers are often put up in two sections; heavy towers are almost always erected piece by piece in place.

The earlier method of erection was by some form of gin-pole or derrick which lifted the tower bodily into place, but to-day the practice of tipping it up on its base is almost universal. Certain designs have the necessary stiffness; for the others temporary wooden braces are fastened between the legs. A cable is then made fast near the top of the tower and to the top of a tilting pole set up at the tower base. This pole is about one-third as long as the tower height and, in addition to the cable back to the tower top, it has fast to its top the hoisting falls which lead to an anchorage about the tower's length from the foundation. A hold-back from the tower top to a good "snub" or anchor completes the rig.

When all is ready two men "stand by" at the foundation and one at the snub; a pull on the falls tips down the top of the tilting pole and through the cable tilts up the tower until falls and cable are in the same line. After this the tilting pole simply hangs on the line and the pull is directly on the tower. As the latter comes near the vertical it is checked by the snub until what have been the upper two legs can be connected to their stubs by one bolt each. The tower is then rotated on these bolts as pins until the other legs can be connected to their footings, when all are bolted up. With foot-plate foundations, if the tower is tilted up it is necessary to put blocking to the level of the bolt top and then to lower the tower after it has been lined up. General practice, however, confines foot plates to towers which are built in place or to those which, as when along a railroad or highway, can be handled bodily by a derrick. Where free access can be had to the foundations a truck or car derrick is by far the best device for erection. As a rule, however, much of the line comes where a derrick cannot be readily taken. The labor of handling and guying a gin pole of sufficient capacity makes it less economical than tilting pole.

Towers so heavy as to require piece by piece erection follow ordinary structural steel erection practice with riveted connections throughout. The smaller towers—except the A-frame or flexible type, which are usually riveted in the shop—are almost invariably bolted together.

Ventilation of Manholes

Every manhole built by a certain Middle Western company is fitted with at least one opening for ventilation. The smallest manholes measure 5 ft. x 7 ft. x 6 ft. high. Holes of this type in which there are no transformers or which contain units of small size are equipped with a 10-in. tile running to the nearest pole, and an 8-in. pipe is then extended from the tile up the pole. For manholes containing transformers rated at 25 kw. or more two such ventilating openings are installed. In this case one vent opens near the top of the hole and one near the bottom, and on the pole the openings are at different levels to create a temperature difference and cause circulation of air.

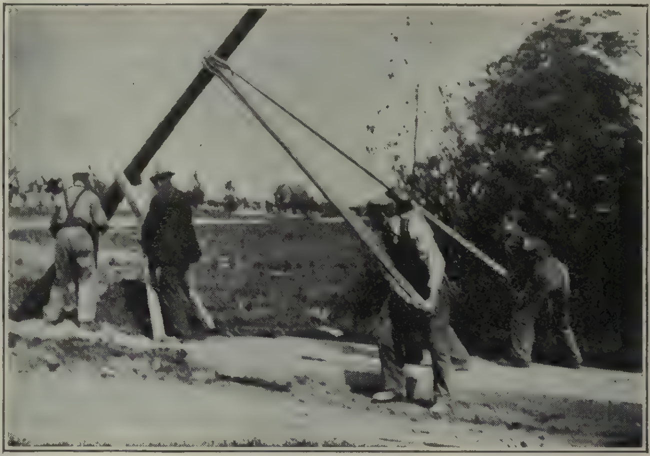
"Jenney" Versus "Deadman"

Convenience Should Be Sacrificed to Safety in Raising Poles

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System

IN THE Aug. 17 number of the ELECTRIC RAILWAY JOURNAL, Charles R. Harte continued the series of admirable articles on overhead construction which he has been contributing by explaining the proper way to set wood poles. I have found these articles the best and most helpful that I have ever seen on the subject.

In the latest article he mentions the "jinny" as a "substantial prop of Y-shape about 7 ft. long." While that name may be the one commonly used for the tool in Connecticut, it is a misnomer so far as some other parts of the country are concerned. In order to assure myself of the fact, I looked the tool up in several catalogs of line material which are distributed over all of the United States, and found that in them the "jenny" or "jenney" is made in the shape of an X rather than a Y, and is therefor built to rest with two feet on the ground.



SETTING A STEEL POLE WITH A "JENNEY"

The prop of Y-shape is generally spoken of as either a "mule" or, more commonly, a "deadman." While the latter is the more universally used, principally because of its greater convenience, yet the other type, which is not mentioned in Mr. Harte's article, is the safer, though undeniably the more clumsy. With the ordinary deadman there is always the possibility of a pike or piker slipping or something else occurring, which will throw the entire weight of the pole to one side. In such a case it is very difficult to keep the deadman upright and there is great liability of the pole tumbling to the ground and seriously injuring one of the men who are attempting to raise it. When the jenney is used the occurrence of such an accident is practically impossible, because the two feet when resting on the ground brace it from both sides so that it is very difficult to overturn.

Owing to the fact that one or two serious accidents occurred while poles were being raised with deadmen, their use was forbidden several years ago on the railway system with which the writer is connected. Since then there have been no such accidents.

Subsoil and Its Important Relation to Track Construction

By R. C. Cram

Assistant Engineer, Way and Structure Department,
Brooklyn Rapid Transit Company

The Author Analyzes Track Development Since the Beginning of Electric Railway Operation—He Explains Why Subsoil and Ample Drainage Are Prime Requisites in Track Construction

> Among the many depraved traits that inanimate matter possesses, none has caused greater surprise or reflected more severely on the skill of engineers than the behavior of rails and joints since they were made to do service under electric cars, and notwithstanding that a great amount of inventive genius and experimental effort has been expended in improving details of foundations, ties, rails and joints, street railway companies everywhere feel more or less solicitude lest they fail to secure the highest standard of excellence desired.
>
> Although no construction with which we are acquainted meets all requirements in a fully satisfactory manner under all conditions, great advances have been made, and this line of engineering, which heretofore has been considered an humble branch of the profession, is now receiving the attention of the best engineering talent in the country, and some of the modern arrangements represent notable and important improvements over former practice.

THE foregoing quotation might have been written yesterday in comment on present-day track construction, but it really was written in 1892 by the late C. B. Fairchild in his memorable work on "Street Railways."

An editorial in the ELECTRIC RAILWAY JOURNAL not long ago commented upon the important report recently submitted by the committee on stresses in track of the American Railway Engineering Association as follows:

> It is well known that railroad track is a structure which has been evolved from previous practice and experience rather than from study and experimental data along scientific lines. It has remained for this committee to earn the enduring regard of the engineering profession through its demonstration that track is subject to known laws and scientific treatment in common with other engineering structures. The proof that track is an elastic structure acting in accordance with Hooke's law is of itself a material contribution to the sum of engineering knowledge.

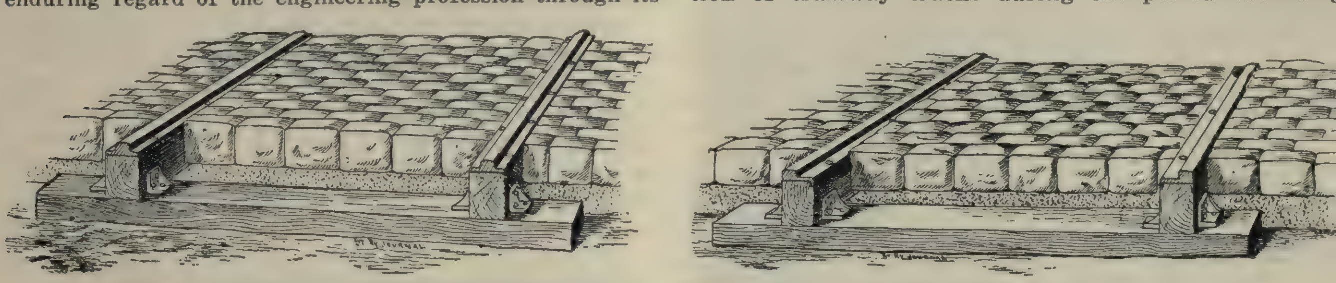


FIG. 1—ORDINARY STRINGER CONSTRUCTION FOR HORSE CAR LINES, WITH CENTER BEARING AND SIDE BEARING TRAM RAIL

In the light of this editorial statement we may judge that electric railway engineers need not feel that there is so much reflection upon their skill after all, since it has taken steam road engineers such a long time to discover some of the fundamental laws governing their track construction.

Study of Strength of Materials Necessary in Track Design

At last the fact is becoming recognized that the design of tracks is not a simple matter, whether they are located on private right-of-way or in paved streets. On the contrary, their design calls for the exercis of extreme care and engineering skill in the selectio and utilization of a number of different materials whic must be united in one structure, just as a great offic building must be assembled with materials from man sources. In order successfully to design either a building or a track structure there must be an appreciatio of the qualities and strengths of materials combine with the knowledge of their performance under varyin conditions which mainly comes with long experience The principal materials in a track structure befor assembly are: Soils, gravel, crushed stone, sand cement, timber, iron and steel, together with a multitud of paving materials such as granite, wood block, brick sandstone, slag-brick, pitch and various combination of bitumen with stone. Some of these items, such a rails, ties, concrete and pavements, assume the positio of added items when considered in their assembled state

It will be the purpose of this and subsequent article to consider these materials in their relation to th track structure.

Modern Track Dates from the Beginnin of Electric Operatio

Street railway tracks have been in process of devel opment for more than eighty years, and during th first half of that period progress was exceedingly slow In fact, there was no radical change in the construc tion of tramway tracks during the period extendin from the introduction of horse cars (about 1832) to th important change in motive power from horses to elec tricity which began about 1888. With the advent o electric power came the real beginning of the chang in track construction which led to the generally accepte types of track in use to-day. It is of interest to not that even in 1892 the main features of the presen type of construction were advocated and used to som extent. In fact, a report on proper track constructio was presented to the American Street Railway Association in that year which, if it were edited a bit, coul just as well bear this year's date, since it pointed ou practically all the essentials which are considered valuable to-day.

We may think we are very modern in our use o concrete in track construction but it was used with tramway tracks in Great Britain thirty or more years ago (see Fig. 5). Even the steel anchor chair for a concrete base, which has been used in the past by the surface lines in Philadelphia, had its predecessor in tracks in Bristol, England, as early as 1892 (see Fig. 6).

The American Street Railway Association report herein referred to also settled the mooted question of "Use of T-rails in paved streets" by saying that they were the best rails to use and should be adopted wherever municipalities would permit. Even the matter of standardization of rails was considered in that year, and it was suggested that there was no need for more than six different rail sections, but it was not until 1914, twenty-two years later, that the association finally adopted four standard girder rails, two guards and two tangent rails. Truly the mills of the gods grind slowly. What a long time the rail mills were occupied in rolling "personal" rail designs for street railway engineers!

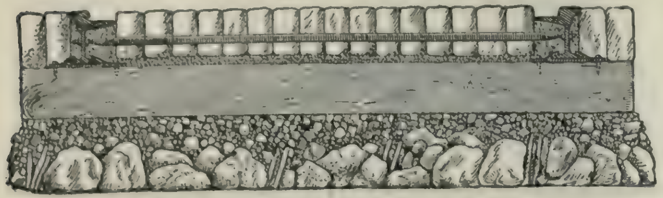


FIG. 2—EARLY ELECTRIC TRACK CONSTRUCTION; STONE BALLAST, 6-IN. RAIL SPIKED TO TIES

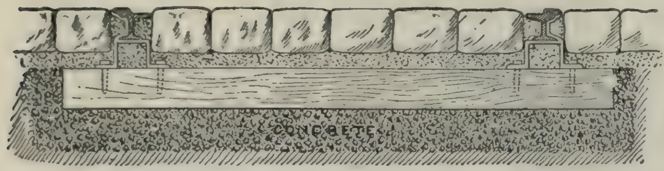


FIG. 3—EARLY ELECTRIC TRACK CONSTRUCTION, 6-IN. RAIL ON CHAIRS, CONCRETE BALLAST

Wherever we see a track which is giving good service, we cannot learn why it does so from a casual examination of it as a unit, especially if it is in a paved street. It is necessary to inquire into the details of construction which are combined in the unit. From this detailed examination we may learn how the various elements are combined and we soon find that there are quite a number of factors which have an influence in the design of track structures. Most of them will be found essential in the consideration of both open and paved track, but those which apply to paved track only will be easily recognized. The following list of factors of design is taken from the 1914 report of the committee on way matters of the American Electric Railway Engineering Association upon the subject of proper foundation for tracks in paved streets.

TABLE I—BEARING VALUES OF SOILS
(Compiled by American Concrete Institute, 1914)

Material	Safe Load in Tons per Square Foot
Quicksands and wet soils	0.1 to 1.0
Dry earth according to depth below surface	1.0 to 3.0
Moderately dry clay, confined	2.0 to 4.0
Dry, stiff clay	4.0 to 6.0
Sand, confined	2.0 to 6.0
Sand, compact and cemented	4.0 to 8.0
Gravel, cemented	8.0 to 12.0
Rock	25.0 to 200.0

TABLE II—CLASSIFICATION OF SOILS
(Compiled by United States Department of Agriculture)

Key	Material	Size mm.	Size mm.	Screens Pass through	Screens Retain on
1	Fine gravel	2.	1.	No. 10	No. 18
2	Coarse sand	1.	0.5	No. 18	No. 32
3	Medium sand	0.5	0.25	No. 32	No. 70
4	Fine sand	0.25	0.10	No. 70	No. 160
5	Very fine sand	0.10	0.05	No. 160	No. 230
6	Silt	0.05	0.005	.....	.....
7	Clay	0.005	0.000	.....	.....

By the number of sieve is meant the number of meshes per lineal inch, of wire cloth, woven from brass wire, having the following diameters for

	Diameters
Sieves Nos. 10 and 18	0.0165 inch
Sieve No. 32	0.0112 inch
Sieve No. 70	0.0045 inch
Sieves Nos. 160 and 230	0.0024 inch

"Factors Influencing Design—From Report of Committee on Way Matters, 1914; (1) Character of subsoil. (2) Bearing power of soils. (3) Drainage of subsoils. (4) Effect on electrolysis. (5) Forms of substructure. (6) Live and dead load to be carried. (7) Forms of track superstructure. (8) Pavement. (9) Headway and speed of trains. (10) Street improvements. (11) Subsurface structures. (12) Street and car traffic."

No. 7, forms of track superstructure, is subdivided into five factors which have a further influence upon design; these are: (a) Ties; (b) rail; (c) rail fastenings; (d) rail joints, and (e) pavement.

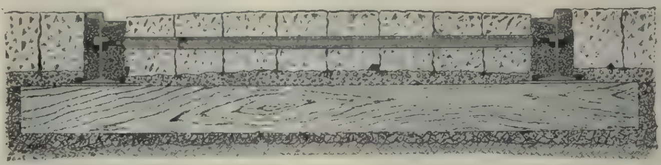


FIG. 4—EARLY ELECTRIC TRACK CONSTRUCTION (ABOUT 1892), 9-IN. TRAM GIRDER RAIL SPIKED TO TIES

There is little question but that the most important items are those relating to character, bearing power and drainage of subsoil. The 1914 way committee report above mentioned classified subsoil as the controlling factor in design and submitted a table giving data on the bearing values of soils (see Table I). In 1915 the committee again emphasized these factors and presented a classification of soils (see Table II), as determined by the Department of Agriculture, with a conclusion that the classification of soils found in city streets is desirable. Meanwhile the committee on stresses in track of the American Railway Engineering Association was carrying its experiments forward and now has in preparation a report on bearing values of soils which should be of great service.

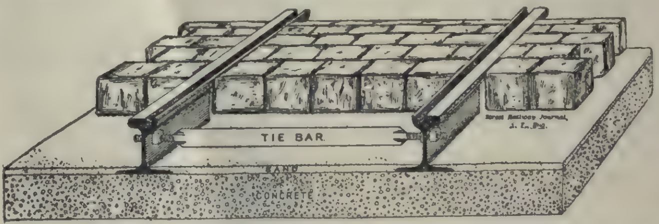


FIG. 5—BIRMINGHAM (ENGLAND) TRAMWAY CONSTRUCTION, USING CONCRETE WITHOUT TIES, ABOUT 1890

The 1892 report presented to the American Street Railway Association previously mentioned had the following to say in regard to subsoil and drainage:

> The depth of the excavation must be determined by the depth of the rail and tie, plus the space allowed for tamp-

ing. The condition of the soil must govern the latter exclusively, but in the reconstruction of the roadbed, where the operation of cars will permit, and in all new work, unless the soil is of sandy character, the following plan will not only provide suitable subdrainage but will also insure permanency: Remove earth to a depth of 8 in. below bottom of tie; roll thoroughly with a heavy horse or steam roller; spread a layer of cinders, crushed rock, gravel or furnace slag 6 in. to 8 in. in thickness and again roll until same is well bedded and leveled. . . . The fact that the material so placed provides a splendid subdrainage is the best argument in its favor and will commend its adoption where soil demands it; for it must be remembered that it is far more expensive to open up and retamp poorly-constructed track than to properly construct and provide subdrainage at the outset.

We would not think of constructing a building of importance without determining beforehand the nature of the soil upon which we were to lay the foundation. If it is good practice to do this in connection with the design of a building, it is no less so when the design of tracks is under consideration, and the premature failure of many miles of so-called permanent track in the past may be laid to either the lack of information relative to the subsoil conditions or to the failure fully to appreciate such information as was obtainable. The fact that tracks designed with due regard to meeting all the controlling elements of design have been made to stand up, after reconstruction, in places where earlier tracks had failed before their time is sufficient warrent for the foregoing statement. However, some consideration must also be given to the not infrequent situation which formerly obtained wherein the funds provided for original construction were not sufficient to permit the engineers to incur the expense which would have been necessary fully to meet the conditions.

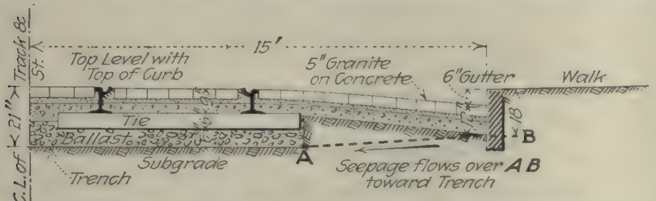


FIG. 7—HOW A TRACK TRENCH MAY RECEIVE WATER FROM ADJACENT ROADWAY

Ample Drainage Prime Requisite in Track Construction

Ample drainage is the prime requisite in track construction. This must be provided not only for the subsoil but for the surface in order to prevent infiltra-

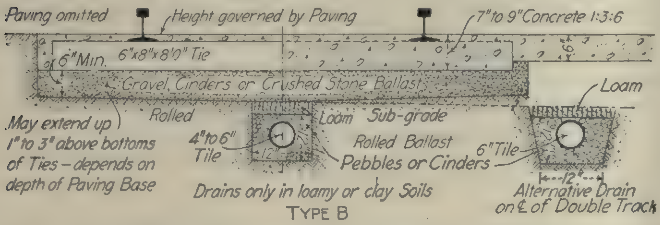

Paving omitted
Height governed by Paving
7" to 9" Concrete 1:3:6
6" Min.
6"x8"x8'0" Tie
Gravel, Cinders or Crushed Stone Ballasts
Loam
May extend up 1" to 3" above bottoms of Ties – depends on depth of Paving Base
Rolled
Loam
Sub-grade
4" to 6" Tile
12"
Rolled Ballast Pebbles or Cinders
6" Tile
12"
Drains only in loamy or clay Soils
Alternative Drain on ℄ of Double Track
Type B

FIG. 9—TYPE B—BALLASTED TRACK CONSTRUCTION RECOMMENDED BY THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION

tion of surface water. Moisture in any form is the chief enemy, and water and frost will cause more damage to tracks than any other agency, bad joints not excepted. It should not be forgotten that the track trench takes on the form of a drainage ditch for the rest of the street, even though it is backfilled with the track structure and paving materials. This usually has a depth of from 15 in. to 21 in., depe upon the depth of the rails and ballast, and it seen from Fig. 7 that the bottom of the trench be 9 in. below the bottom of a 6-in. macadam or shallow pavement even at the gutter. With pavements this depth becomes less, but even w

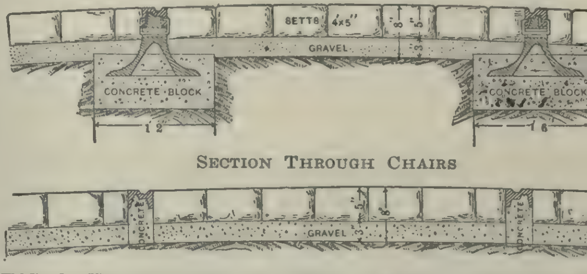


FIG. 6—EARLY USE OF STEEL YOKES OR RAIL ANC IN CONCRETE IN BRISTOL, ENGLAND

5-in. granite pavement on concrete, and 7-in. rails, ties and 6 in. of ballast, the difference in levels be at least 1 in. Hence, there is great opport for stray water from the surrounding surface street and adjacent property to seek the track t

How much water actually reaches the trench i way is dependent upon the character and condition

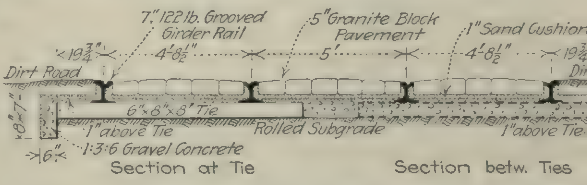


FIG. 8—A METHOD FOR PREVENTING DAMAGE ROADBED FROM SEEPAGE OF WATER

pavement and of the soil. How much of it sta the trench also depends first upon the soil and upon the drainage provisions. A comparatively pensive scheme for preventing seepage of surface to the track trench from the adjacent roadway su where the latter is not paved and the soil is k to be a water-retaining clay, is shown in Fig. 8. consists of a dependent curb constructed as a part concrete base for track pavement and extending 8 in. below the level of the bottom of the ties. I particular instance shown it was not thought nece to use ballast upon the subgrade, but the preca

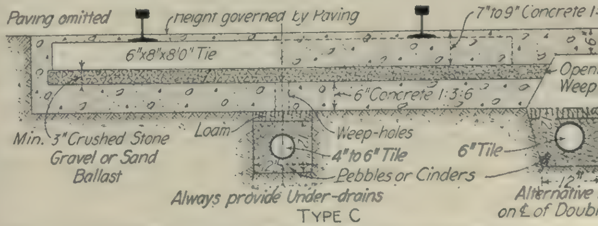


FIG. 10—TYPE C—CONCRETE SLAB SUB-BALLAST T CONSTRUCTION PROPOSED FOR USE WITH VERY POOR SOILS

was taken to consolidate it thoroughly by rolling a 10-ton roller.

In most cases where the soil is of such a chara that ballast of gravel or crushed stone must be it will also be found that the ballast alone should be depended upon to provide sufficient under-drain

If the ballast is well compacted, especially by rolling, water will not flow through it readily. Furthermore, the soil works up through it more or less after a time and tends to prevent the passage of water. It is for these reasons that most of the designs for modern ballasted tracks now make due provision for subsoil drainage by means of tile drains. It will be seen from the foregoing discussion of drainage provisions that dependable data upon the bearing value of soils will be of great assistance in connection with the design of tracks. Meanwhile, the classification of soil by mechanical analysis combined with the tentative bearing values of soils now available should be used by track engineers in every case where there is any doubt as to how to meet uncertain soil conditions.

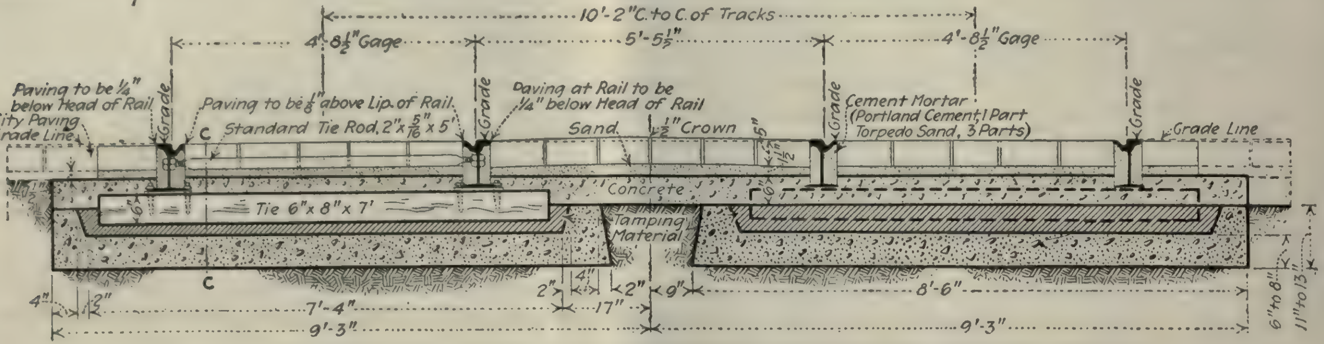

10'-2" C. to C. of Tracks
4'-8½" Gage
5'-5½"
4'-8½" Gage
Paving to be ¼" below Head of Rail
City Paving Grade Line
Grade
Paving to be ⅛" above Lip of Rail
C
Standard Tie Rod, 2"x5/16"x5'
Grade
Paving at Rail to be ¼" below Head of Rail
Sand
½" Crown
5"
1½"
Grade
Cement Mortar (Portland Cement, 1 Part Torpedo Sand, 3 Parts)
Grade
Grade Line
Concrete
6"
Tie 6"x 8"x 7'
Tamping Material
C
4"
2"
7'-4"
2"
4"
2"
17"
9"
8'-6"
9'-3"
9'-3"
6" to 8"
11" to 13"

FIG. 11—CROSS-SECTION OF TRACK CONSTRUCTION ON TWELFTH STREET, CHICAGO

In treating subsoil preparatory to laying the tracks, it will often be found that the practice of rolling will be of material assistance. It is stated by the way committee that a more even distribution of load is effected, that the bearing power of the subsoil is increased, that rolling should be done wherever practicable under working conditions and warranted by the kind and condition of the subsoil, and that it is especially desirable wherever there has been much disturbance due to sewers and cross trenches under the tracks. Since uniformity is desirable in the track structures as a whole, it seems to be a fundamental principle of track design that the first place to secure uniformity is in the subgrade upon which the track is to be founded. There is no question but that this can best be done by rolling, with most soils. Occasionally it is necessary also to add broken concrete upon which to operate the roller. Even where the ballast is to consist, in part, of a concrete slab as sub-ballast, the rolling is just as essential in order that the slab will obtain a uniform bearing throughout. It should not be forgotten that even though the subsoil can be stabilized by rolling, it is essential that it be kept in this state by ample drainage provisions.

An example of the type of track construction wherein drainage is properly provided is shown in Fig. 9, which is the recommended, type B design as adopted by the American Electric Railway Engineering Association in 1915. In the meantime the way committee presented another design known as type C, utilizing a concrete slab sub-ballast with similar provision for underdrain, as shown in Fig. 10. It was intended for use on very heavy water-retaining soils and other uncertain ground.

The Engineering Association did not care to adopt this as a recommended design, although its merits were recognized, because of the fear that it might be forced upon railway companies by municipal authorities in many instances where such an expensive construction would be unnecessary. However, it is a type which is used voluntarily to a considerable extent under soil conditions which almost demand its use. Thus the concrete slab feature was employed recently in Chicago, as will be seen from Fig. 11, which is reprinted from an article describing its use, which appeared in this journal for March 30, 1918. The article in question, unfortunately, does not state what provisions were made for under-drainage other than to say that the construction was built upon a lake sand fill about 9 ft. in depth which was used to fill up cellars of houses over which, through a street-widening scheme, it was necessary to lay the tracks.

Standard Rail for Australia

American Association Form of Groove and Guard Adopted—Rails to Be Rolled in Australia

A CONFERENCE of Australian electric tramway engineers was held during May, 1918, in Sydney, N. S. W., to consider the adoption of a standard grooved girder tramway rail for use by electric tramway undertakings in the Commonwealth. Owing to the difficulty—due to the war—of importing rails from overseas, the manufacture of rails in Australia has become necessary.

The Broken Hill Proprietary Company, Ltd., which has steel works and rolling mills at Newcastle, N. S. W., has stated that it will consider the installation of a plant to roll grooved girder rails if a standard is adopted.

The conference passed the following resolutions:

1. That a standard girder rail be adopted for the tramways of the various states of the Commonwealth.

2. That the weight of the girder rail for tangent track shall not be less than 90 lb. per lineal yard, the exact weight being subordinated to the design.

3. That the height of the girder rail be not less than 6 in.

4. That the width of the flange shall not exceed the height of the rail by more than ½ in.

5. That the conference is agreed that the form of groove and guard of the rail should take the form of the present standard of the American Electric Railway Engineering Association.

6. That the tread of the proposed section of rail shall approximately conform to that shown in blueprint No. 3365 of the Adelaide Municipal Tramways Trust.

7. That Mr. Cowdery, engineer for permanent way

New South Wales Government Tramways, be asked to get from the manufacturers the chemical and physical tests of steel that they can guarantee for tramway purposes, and that it be left to him to design a rail in conformity with the resolutions of the conference.

The tread referred to in resolution 6 is struck to a radius of 12 in. with a $\frac{5}{16}$-in. radius on the running edge, which the conference believed would tend to give a longer life both to wheels and rails.

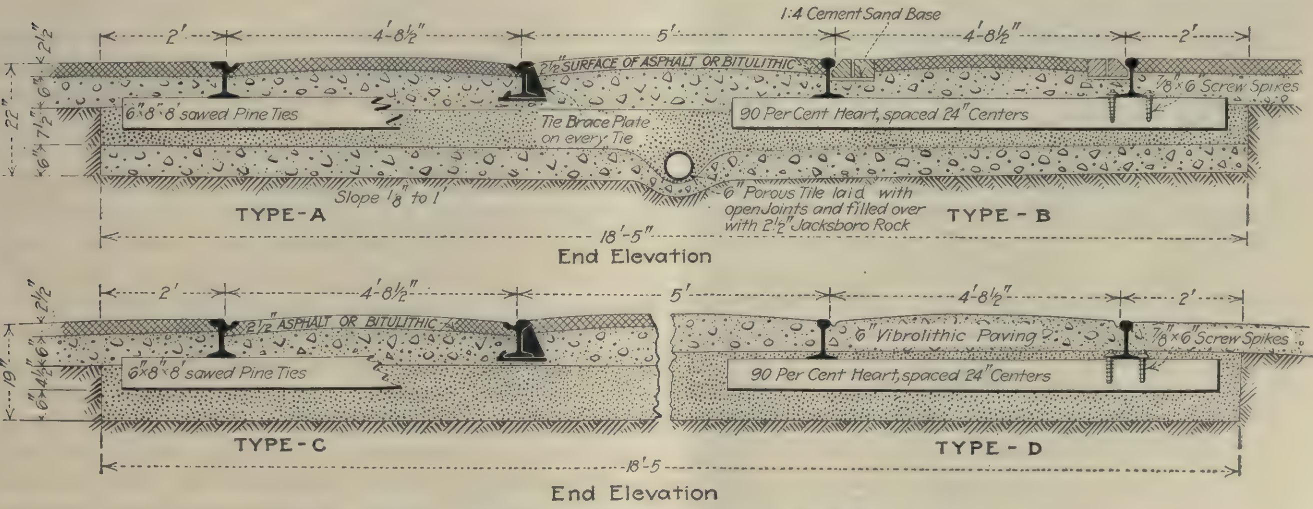
New Ballasted Track Standards and Construction at Dallas

Company Has Already Spent $200,000 for Rehabilitation Under Service-at-Cost Plan—More Work Is Now Under Way

THE Dallas (Tex.) Railway, under the immediate direction of B. R. Brown, engineer of way and overhead construction, is employing about 250 men to rebuild 8 miles of track, construct 5 miles of extensions and also carry out various special work betterments.

For these activities the company since Oct. 1, 1917, has adopted a new series of constructions designated as types A, B, C and D in the accompanying illustration. In these a concrete sub-base is favored only where the soil is waxy or treacherous; with good sand or loam a 6-in. coarse gravel ballast is favored. The first construction of this latter sort consisted of 1000 ft. of double track put down on Elm Street between Ervay and Harwood. This track has held up so well that up to May, 1918, it received no other attention than the use of a reciprocating grinder to remove a little cupping.

Still more conclusive evidence to the company of the merits of ballasted construction for Dallas was its experience with a big piece of special work put down at Elm and Lamar Streets, one of the busiest sections of the city. The material used was simply gravel ballast, wood ties and creosoted pine blocks on a mortar cushion. When this had to be disturbed late in May to weld a broken frog, the fastenings of the intersection as a whole were found in excellent condition.



NEW TYPES OF CONSTRUCTION IN PAVED STREETS OF DALLAS

It will be observed that tile drains are used with the concrete sub-base types and that brace plates go with girder sections. Type D T-rail construction is handicapped by a monolithic, aerated concrete called "Vibrolithic." This is a local paving favorite which the railway is obliged to use. Obviously the company would be better off were it permitted to use blocks of some kind, even only as headers, for rail vibration is likely soon to break up the paving and so put the railway to much costly maintenance which was beyond its control to avoid.

REMOVING OLD SINGLE TRACK FOR NEW DOUBLE TRACK ON COLUMBIA AVENUE IN DALLAS

The following is a list of some of the rehabilitation and new work which has been completed or is in process in Dallas:

Rerouting for South Belt cars on Second Avenue and building of Second Avenue extension with rearrangement of Fair Park Terminal, costing $121,000.

Special work changes at Cantegral and Bryan Streets to permit trailer operation over the Bryan Street line, costing $12,805.

Special work changes at Cantegral and Live Oak Streets.

Removal of single track and installation of double track on Columbia Avenue, costing $76,860.

Installation of special work at Commerce and Lamar Streets, to permit the running of Oak Cliff cars on crosstown routes, costing $20,720.

Several hundred Apex welded joints have already been installed with an Indianapolis welder, and about 2000 of these joints are on hand or on order. All concrete work is done with the new 13-ft. Koehring mixer.

To date about $200,000 has been spent for track rehabilitation under the Dallas service-at-cost plan.

Diagnosing and Correcting the Causes of Low Vacuum

By Hartley Le H. Smith
Chief of Testing Bureau
Brooklyn Rapid Transit System

Eternal Vigilance in the Matter of Maintenance of Surface Condensers and Auxiliaries Is the Price of Keeping Up a Good Vacuum and Therefore of Getting Good Results in the Turbine or Engine Room of the Power Plant

THE task of the power-plant engineer who is charged with the maintenance of high vacuum in surface condensers is one requiring attention to maintenance, day in and day out. He must apply in performing his task a combination of scientific diagnosis of the causes of variation from the best vacuum practically attainable, and he must also prescribe the best lines of attack in correcting abnormal conditions. He must also secure the co-operation of skilled maintenance men who can, with minimum waste of effort and time, reach the offending parts and radically better their performance. The whole matter seems to me to be analogous to the dual rôles of the medical specialist who excels in diagnosis and the practicing physician whose field is that of medicine.

Good Vacuum Means High Turbine Economy

It must be kept in mind that the best obtainable vacuum in any plant and with any definite type of equipment varies very greatly throughout the year. In a former article I pointed out that the only vacuum worth anything in a turbine plant is the vacuum in the turbine exhaust nozzle. It is this vacuum, and this alone, which affects the turbine economy. Of course, there is no other object to be attained in vacuum maintenance than the keeping up of high turbine economy.

Turbines differ from engines in that they actually do expand the steam down to the vacuum in the exhaust nozzle. Steam engines do nothing of the sort. The maintenance of a given vacuum in an engine exhaust means nothing but that the back pressure on the exhaust stroke is thereby established. The ratio of expansion during the working stroke, which is the most important factor in steam economy, is left entirely unaffected in any direct manner. With a steam turbine this is not the situation, for the ratio of expansion is the ratio of the absolute pressure on the turbine side of the governor valve to the absolute pressure in the turbine exhaust.

Having noticed the close relationship of the turbine exhaust vacuum and its relation to the turbine economy, we may pass on to another point. The turbine economy itself is determined partly by the design of turbine and condenser, and partly, and secondarily, by the standard of maintenance.

For instance, if a power plant had in it two turbines and two condensers of the same size, and if the condensers were of identical design but one of the turbines was of an older pattern while the other was modern, the modern turbine would show the higher vacuum in its exhaust nozzle, even though the standard of condenser maintenance were the same. This would be due to the fact that the modern turbines possess characteristics due to the accumulated experience of the designers.

From the above facts it is evident that before the quality of a vacuum can be judged properly it is necessary to accumulate and to analyze the records of actual vacuum performance of *each* turbine, or at least each type of turbine and condenser of identical joint design. Thus, as these data accumulate, the performance of a machine may always be judged against the *best performance previously attained.*

The Turbine Load Affects the Vacuum Also

In considering steam turbine exhaust vacuum not every engineer gives adequate weight to the effect of the turbine load at which the vacuum is measured. All other conditions being equal, the vacuum in a turbine exhaust falls off at an increasing rate with increasing loads.

If the vacuum is plotted against the load the resulting curve will be seen to have the form of a parabola. Those mathematically inclined will recognize this in the form of the following formula:

$$V = a - bL - cL^2$$

In this formula V is the vacuum (corrected for standard barometric pressure), L is the generator load in kilowatts, and a, b and c are coefficients determined by experiment.

The numerical values of b and c for a typical turbine and condenser, the condensing equipment being in first-class condition, with respect to supply of ample condensing water and properly low entrance temperature, normal air leakage, and excellent air removal, would surprise anyone not conversant with the matter.

Of late years turbine and condenser contracts have taken this rapid falling off of vacuum into account, but at one time not so long ago they did not do so.

I call attention to this matter of relation of vacuum to load, although in practical, every-day work in the power plant, while the relation outlined is well understood, it is customary to make observations at some standard load when possible. When this is not possible the engineer approximates the condition as nearly as he can, and then allows for the unavoidable (but not too great) variations from the standard load.

What Is the Best that the Condenser Can Do?

Without desiring to go into the theory of this subject unnecessarily I think that it will be well to consider briefly the ideal performance of a condenser, that is, the degree of vacuum beyond which it is impossible to go. This condition is shown by what is known as the elementary heat balance equation of the turbine and condenser as a combined unit. Let us look at this equation a moment.

In order that we may write it, let us use the following abbreviations:

S = steam consumption of turbine, in pounds per hour.
L = turbine load, in kilowatts.
W = quantity of condensing water, in pounds per hour.
H = total heat above 32 deg. Fahr. in steam delivered to the turbine in B.t.u per pound.
t_1 = entrance temperature of condensing water, deg. Fahr.
t_2 = discharge temperature of condensing water, deg. Fahr.
t_3 = temperature of water leaving condenser hotwell, deg. Fahr.
E = combined electrical and mechanical efficiency of the generator and the mechanical efficiency of the turbine, expressed as a fraction.

With these symbols we may write an equation, putting on the left an expression for the total heat entering the condenser and on the right the total heat removed from the condenser, using as a basis the quantities corresponding to one hour of time. It will be remembered also that one kilowatt-hour is equal to 3412 B.t.u. The heat equation is then:

$$\left[SH - \frac{3412}{E}L\right] + W(t_1 - 32) = W(t_2 - 32) + S(t_3 - 32)$$

In this equation SH is the total heat entering the turbine, and $\frac{3412}{E}L$ is the total heat converted first into mechanical energy at the turbine shaft and later, for the most part, into electrical energy. The difference between these two terms is obviously the total heat delivered by the turbine to the condenser. The remaining term on the left-hand side of the equation is the total heat brought into the condenser by the entering condensing water.

The terms on the right-hand side of the equation are the total quantities of heat rejected from the condenser by way of the condensing water discharge and the hotwell discharge.

The left-hand side of the equation, therefore, represents the total heat entering the condenser, while the right-hand side represents that leaving it. If we neglect the amount of radiation from the turbine and the condenser, a negligible quantity, the amount of heat which enters the condenser must be equal to that which leaves it and the possibility of writing the heat balance equation is established.

The great significance of an equation representing on one side all of the heat entering a condenser and on the other side all of the heat leaving a condenser, hardly needs to be emphasized.

By simple algebraic transformation the equation may be written in the form:

$$S[H - (t_3 - 32)] - \frac{3412}{E}L = W(t_2 - t_1)$$

This is a very useful form of the equation. The right-hand member represents the total heat transmitted through the tubes from the steam to the condensing water. This form of the equation is also useful under certain circumstances for calculating the quantity of condensing water which is circulating.

The main point to be emphasized, however, is the very great significance of the temperature of the condensing water as it enters the condenser. The variation in this temperature, t_1, is the most important element in influencing the working performance of the condenser, as is evident from the heat balance equation in the form first written above.

This fact may be made clear by considering the term $W(t_1 - 32)$, appearing in the equation in its first form, and the term $W(t_2 - t_1)$ appearing in the equation in its second form.

The first term is the total heat brought into the condenser by the entering circulating water; the second term is the total heat transmitted through the condenser tubes by reason of the condensation of the steam and absorbed by the circulating water. It is true, although not often realized, that the first heat quantity exceeds the second heat quantity during the greater part of the year. That it actually does so is evident from a comparison of the terms $(t_1 - 32)$ and $(t_2 - t_1)$. As W is common to both terms, it cancels out.

For example, suppose that in summer the maximum value of t_1 is 78 deg. Fahr., and that in winter the minimum value of t_1 is 36 deg. Fahr. Also assume that the mean temperature of the entering water throughout the year is halfway between these two values, that is, 57 deg. Fahr. Assume further that the value of $(t_2 - t_1)$ is 17 deg. Fahr. This difference may, for the purpose of the argument, be considered as independent of the season of the year, and it does, in fact, undergo but little seasonal variation throughout the year.

Then at the maximum in summer $(t_1 - 32) = 46$ deg., at the mean temperature of the year it is 25 deg., and at the minimum temperature in the winter it is 4 deg. At the maximum temperature in summer and during the greater part of the whole year it very much exceeds the value of $(t_2 - t_1)$ which has been assumed equal to 17 deg., and is not affected by seasonal variation, whereas at the minimum temperature in winter it is very much less than $(t_2 - t_1.)$

This great fluctuation in relative magnitude of the total heat brought into the condenser by the circulating water and the total heat transmitted through the tubes and absorbed by the circulating water gives to the entrance temperature of the circulating water, t_1, the rôle of premier variable in the entire condenser performance.

Entrance Temperature of Circulating Water Is of Prime Importance

For the reasons outlined, the principal guide in studying the vacuum in a power plant, for the purpose of maintaining it at the highest possible value, is the relation of turbine exhaust vacuum and entrance temperature of circulating water. These variables should be plotted against each other over one, two, three or more years and should be given first consideration in judging of any one day's performance.

This graph establishes the best performance so far attained at every entrance temperature of circulating water, and also indicates the numerous performances in which the record is not the best at the same temperatures. With each new day's observations before him, the engineer asks: "Does this vacuum, considering the entrance temperature of the circulating water, equal the best previous performance, does it establish a new record, or does it fall far short of the best?"

Getting at the Root of the Trouble

If the vacuum is notably defective under the conditions controlling it, the natural question is: "Why?" The analysis of this condition may properly proceed about as follows:

First comes the question of the quantity of circulating water. Our heat balance equation may be rearranged in this form:

$$W = \frac{S[H - (t_3 - 32)] - \left(\frac{3412}{E}\right)L}{t_2 - t_1}$$

The quantities H, t_3, and L may be measured at the time the vacuum observation is taken in addition to t_2 and t_1, the discharge and entrance temperatures of the circulating water.

In practice, however, H is not specifically measured, because even with considerably varying turbine admission pressure and superheat, its variation is practically negligible. The load L is naturally measured because every effort is needed to see that it has some standard value. The sensitiveness of turbine exhaust vacuum to load variation has been commented upon earlier in this article. Hence, the almost inevitable, although slight, departures from standard loads are noted down.

The efficiency value E may be guessed at and is known to be about 0.95. It remains practically constant and in the equation has no great importance. The quantity S, however, has very great importance. Many turbines are now provided with steam-flow or hot-well meters, from which the value of this quantity may be read directly. Where there are no such meters but where steam economy tests have at some time been made, the value of S may be estimated from the test results using the observed values of load (and of vacuum for the purpose of using the vacuum correction). Where no tests have been established the guaranteed economy may be used, supplemented by conventional rules for vacuum correction.

In one or another of these ways the quantity of condensing water in circulation may be calculated. It will be found in some cases to undergo wide and rapid fluctuations. Whether it does so or not depends, of course, upon the cleanliness or dirtiness of the condensing water supply. Important here are the nature and effectiveness of the arrangements for freeing the water from dirt and trash before it gets into the condenser, particularly the intake screens.

Amount of Circulating Water Need Not Be Calculated

Another and an abbreviated way of considering the influence of the quantity of condensing water omits the actual calculation of it and depends upon the fact that it is very nearly inversely proportional to the rise of temperature of the circulating water. The equation for W may be written:

$$W = \frac{1}{(t_2 - t_1)}\left(S[H - (t_3 - 32)] - \left(\frac{3412}{E}\right)L\right)$$

As it is necessary to bring the load L to some standard value with fairly close approximation preliminary to making the vacuum observations, it follows that the main source of variation of the turbine steam consumption S will have been eliminated. This leaves only the effects of steam pressure and superheat variation (which themselves affect H but in relatively slight degree) and the effect of vacuum variation at approximately standard load.

This last, although not negligible, has a variation range which is quite small compared with daily variation, often quite wide, of $(t_2 - t_1)$ and hence its reciprocal $\left(\frac{1}{t_2 - t_1}\right)$.

There remains, then, only the variation of the hotwell temperature t_3. This is bound to have a wide seasonal variation and a much smaller variation due to the observed vacuum and the actual load. Its total effect, however, is quite small, as may be seen from the equation, because it subtracts from H, which has a large and nearly constant numerical value.

Summing up, then, it appears that the quantity of condensing water circulating is approximately inversely proportional to the rise of temperature of the circulating water. If necessary, it may be assumed to be so and calculations may be omitted.

Looking for the Cause of Circulating Water Shortage

The next step in the process is to consider the causes which may explain inadequacy in the supply of circulating water. First and most obvious is circulating pump speed. This speed is naturally measured during or close to the time of vacuum observations and any notable departure from the speed considered normal for the season of the year would be corrected before the completion of observation.

The total hours of condenser operation since the last thorough cleaning of the tubes is next considered. There is a probability that there is some interference with heat transmission through the tubes, caused by reduction in the velocity of the water in the tubes through trash accumulation in the intake water box. There may also be a reduction of water velocity in the tubes due to obstructions in the tubes themselves.

It is a much quicker and cheaper operation to clean water boxes than to clean tubes. However, if the tubes are dirty, cleaning the water boxes will not notably restore the condenser vacuum, whereas if the tubes are cleaned the water boxes are incidentally cleaned.

The hours of condenser operation since the last tube cleaning, therefore, enter as an important factor in forming judgment, together with the seriousness of the departure of the temperature rise of the circulating water from normal.

The suddenness of departure from normal temperature rise may also hint strongly the nature of the obstruction.

Obstruction of circulation from accumulations in the tubes is apt to be a fairly gradual process, whereas the condensing water supply, if a river, may suddenly carry trash which will quickly close the entrances of tubes by accumulating upon the tube sheets. For instance, such conditions may arise when a wind storm has blown many small leaves into the river.

Cleaning the tubes of a large condenser is a slow and costly process, while cleaning the water boxes can be done very expeditiously. Hence, many cases arise where, among several condensers upon which observations have been made during the same day and which show notable falling off from proper circulating water supply, the worst of them is scheduled for tube cleaning and the remainder for mere cleaning of water boxes. This naturally has a bearing upon the vacuum which can be maintained.

The subject, of air leakage and effectiveness of air removal ranks next in importance to adequacy of condensing water supply. Where the source of condensing water is relatively free from dirt and trash, or where modern revolving intake screens make possible the use of finer screen mesh than is possible with stationary screens, the air problem ranks first in importance.

Actual quantitative measurements of air leakage with an air bell may be rapidly made on several condensers in succession if the air bell is fixed in position and permanent piping and valve connections are provided for all condensers in the plant. As a supplement to such quantitative measurements the speeds of the air pumps are to be included as important items to be noted simultaneously with the vacuum measurements and any inadequacies of speed immediately corrected.

Some High Spots in Mr. Smith's Article

There is no other object to be attained in vacuum maintenance than the keeping up of high turbine economy.

The turbine economy itself is determined partly by the design of turbine and condenser, and, secondarily, by the standard of maintenance.

The performance of a machine should always be judged against the best performance previously attained.

The principal guide in studying the vacuum in a power plant is the relation of turbine exhaust vacuum and entrance temperature of circulating water.

Of vastly more importance, however, is the question of effectiveness of air pump action within proper range. Not very much in high vacuum maintenance outranks this in importance. It is useless to have low air leakage into a condenser if the effectiveness of air-pump action is poor. With many condenser air-pumping equipments there is such ample displacement capacity that if effectiveness of the pump action is good even rather rapid air leakage into the condenser produces only trivial effect on the vacuum in the turbine exhaust.

The effectiveness of air-pump action is easily determined, and the determination should be a matter of daily routine. It is only necessary to shut off the pump from the air suction line from the condenser, and to observe the pump vacuum at normal speed, correcting the observed vacuum carefully for barometric pressure and for temperature of the mercury column used in the vacuum measurement. In other words, the absolute pressure which the pump can produce within its own cylinder or casing while working with a closed suction valve should be determined accurately. A log should be carefully kept of these absolute pressures.

There is not much in the whole field of high vacuum maintenance which is more difficult than the speedy correction of ineffectiveness of air-pump action. It cannot be done unless some man in the maintenance force has opportunities by constant practice to become quite expert at the work. He should develop this expertness under the direction of the engineer who is competent to analyze the causes of trouble. These remarks apply especially to reciprocating dry-vacuum pumps. These pumps, aside from maintenance, are very satisfactory in that they create high vacuum with very low steam consumption. On the other hand, certain forms of rotary pumps have high steam consumption and furthermore withdraw no inconsiderable quantities of steam from the condenser (particularly when the condenser air leakage is low). This steam would otherwise appear in the hot well and would thus be used for boiler feed.

The list of symptoms to be considered in connection with condensers in need of maintenance work is not exhausted without giving attention to the temperature difference between the entering steam, coming through the turbine exhaust nozzle, and the circulating discharge water. While this does not alone measure the ease or difficulty of heat transmission through the tubes it is an item of great importance in relation to this heat transmission.

The temperature of the circulating discharge water itself constitutes a variable very close in its connection with the vacuum in the turbine exhaust nozzle, to produce a high value of which is the ultimate object of all vacuum maintenance work. There is practically no air present in a turbine exhaust nozzle. Even in cases where large air leakage occurs through the cylinder casing joint or the turbine shaft glands, the air, while present, cannot be detected. It is utterly "drowned" in the enormous quantity of steam coming through the nozzle from the turbine. The presence of air cannot be determined in a condenser except in its lower regions where the largest part of what entered as steam has been condensed to water.

Therefore at the top of the condenser it may be said that the steam temperature *is* the vacuum. This is true even if careful measurements of temperature and pressure in the turbine exhaust nozzle show lack of agreement with saturated steam values listed in steam tables. The lack of agreement may be in one direction in the turbine exhaust nozzle (possibly due to to undercooling of the steam during turbine expansion), and in the other direction just a bit further down where the nozzle delivers steam to the condenser and the steam strikes the tube bank with a great blast. The latter condition may possibly be due to superheating through sudden arrest of velocity and conversion of kinetic energy. But the disagreement, whatever its cause, is not due to air.

Therefore the *temperature* of the steam is the fundamental thing and the temperature of water in close physical proximity to it (the discharge circulating water) is of great importance also. If the entrance temperature of the circulating water is high or low, if the quantity of condensing water circulating is ample or restricted, if the load departs one way or the other from the standard load aimed at during testing, if these abnormalities occur jointly or severally, the discharge temperature of the circulating water is at once affected. By reason of this and of the close link between water temperature and steam temperature due to the intense heat transmision at the condenser top, the steam temperature is affected and hence the vacuum.

The difference in temperature between steam and water, therefore, bears closest watching. It varies characteristically between winter and summer, due to varying heat absorption by the upper tube bank. This heat absorption in turn is varied by the absorption in the lower tube bank which changes greatly with entrance temperature of circulating water. It varies with varying congestion of heat absorption in the upper tube bank due to varying "drowning" effect of the lower tube bank in a cloud of air. The height of this air cloud is established jointly by the rate of air leakage and the effectiveness of air removal.

When gradual increase of the temperature difference betwen entering steam and discharge circulating water is not to be accounted for by the two categories just mentioned, the engineer prescribes the cleaning of the outside of the tubes by filling up the whole condenser steam space with a suitable chemical solution, such as sodium bisulphate. This, when allowed to stand in the condenser for several hours, has an excellently cleansing effect without being injurious.

Excessive Ash in Coal Handicaps the Power Plant

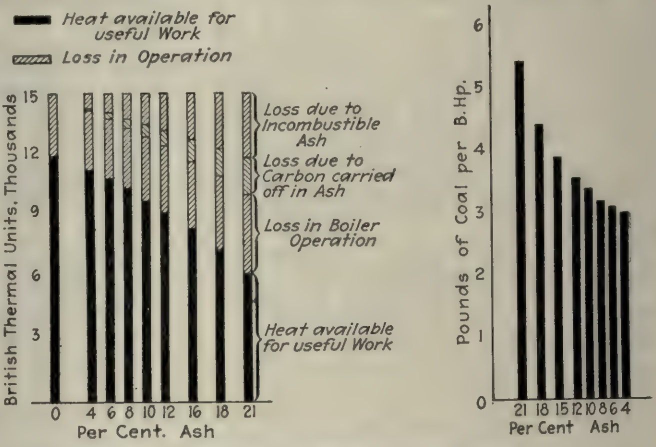
Removable Impurities Should Be Discarded at the Mines in the Interest of Freight Car and Power-Plant Equipment Conservation

A STUDY made by the J. G. White Engineering Corporation for the National Research Council sums up in an impressive fashion, substantially as follows, the losses which are incurred by the use of high-ash coal. The presence of ash reduces the heating value of the coal, increases the coal consumption, reduces boiler capacity and increases the freight-car equipment required for transportation. Each per cent of avoidable ash in the nation's coal adds 5,000,000 tons of unnecessary freight per annum.

The percentage of ash has a distinct influence on the boiler efficiency. As it increases the fireman has more difficulty completely to burn the combustible, hence whereas with a low percentage of ash and good firing we expect about 25 per cent of the weight of the ash to be unconsumed combustible, with coal containing a high-ash percentage it is rarely possible to reduce the combustible in the ash to less than 50 per cent.

One of the accompanying charts shows the effect of varying percentage of ash on coal consumption per boiler-horsepower. It will be noted that for the best coal, with 4 per cent ash, 3 lb. is required, while with 10 per cent ash, the average amount in normal times, less than 3½ lb. is required. Beyond this point the increase is very rapid until for 21 per cent ash the coal consumption amounts to 5.45 lb. per boiler-horsepower. The increase in the ash content of coal seriously reduces the capacity of steam boilers. Power plants to-day are in a serious condition because whereas the load is increasing the capacity of their boiler plants has been greatly reduced due to the poor coal obtainable. Where formerly boilers could be operated at from 200 per cent to 250 per cent of rating during peak periods it is now difficult to secure more than from 150 per cent to 160 per cent. For example, if in a given case eight boilers could do the work of a plant with coal containing 6 per cent ash, nineteen or twenty boilers are required if the coal contains more than 18 per cent ash.

This matter is very serious from the transportation standpoint as is evident from the fact that, considering the lower heating value of high-ash coal, it is possible that 40 per cent of the cars may carry worthless material. Coal containing 21 per cent ash requires 65 per cent more cars than coal containing 10 per cent ash. The trouble is not excessive until 10 per cent to 12 per cent ash has been passed. If therefore we might limit the percentage of ash to the average of 10 per cent, we should reduce our transportation equipment to a practical minimum. We should be able to operate all boilers at a reasonable efficiency and could reduce the number of boilers operated to a little more than one-half the number required with the dirty coal (that is 18 per cent ash or over).



DIAGRAMS SHOWING DELETERIOUS EFFECTS OF EXCESSIVE ASH IN COAL

Coal Storage Regulations Revised

The storage regulations prescribed by the state fuel administrators for public utilities, limiting the amounts of bituminous coal which may be stored in different sections of the country, were given on page 372 of the issue of this paper for Aug. 31. Under date of Sept. 14 the United States Fuel Administration has issued a revised list as follows:

Days of permissible storage for consumers in class 2: Maine, 120; Massachusetts, Vermont, New Hampshire, northern New York, 90; Connecticut, Rhode Island, southwestern New York, 75; southeastern New York and New Jersey, 50; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida, western Ohio, 40; western Pennsylvania, West Virginia, eastern Kentucky and eastern Ohio, 30; lower Michigan, 75.

Applying Engineering Principles Properly in Motor Selection

By C. W. Squier
Electrical Engineer

The Author Shows How to Compare Motors Which Appear to Have the Necessary Characteristics for the Service Designated and to Select the One Best Adapted to Meet Given Requirements

IN DISCUSSING in this series of articles the considerations which enter into the choice of railway motors I have up to this point outlined, first, how the operating requirements constituting any particular class of service are determined; second, how the various technical calculations which enter into the determination of the service and equipment are made, and third, how the numerous graphs which form the basis for deciding on the motors are constructed. By following these steps carefully we are now in a position to make an actual choice of equipment for a definite service.

How a Preliminary Selection of Motors Is Made

In making a preliminary selection of motors that appear to have the required characteristics for the service, as given in my article in the ELECTRIC RAILWAY JOURNAL of April 20, I have made use of the operating characteristic graph shown in Fig. 1. This gives the relation between the number of stops per mile and the schedule speed at which the car is operated. By comparing this graph with similar ones obtained from manufacturers of railway motors, or given in publications descriptive of their motors, I have selected three motors of different size that appear to be capable of performing the service. Characteristic curves of these motors, arranged for the size of wheels, average voltage and gear ratio that I have found necessary are presented in Figs. 4, 5 and 6.

Balancing Speeds of Motors Compared Must Be the Same

In laying out the speed-time graphs for comparing motors of various capacity, it is essential that the balancing speeds of the motors be the same. As the average line voltage and the diameter of the driving wheels in this case are fixed, the only thing that can be varied is the gear ratio. For the motors under consideration I have chosen a balancing speed of 19½ m.p.h. and have arranged the gear ratios of the three motors so that they will have this balanced speed.

In order to decide intelligently as to just what this balanced speed should be, I took the characteristic curves of one of these motors which would perform the service most economically and plotted a series of speed-time graphs for different gear ratios which would give free running speeds from 16.75 m.p.h. to 20.5 m.p.h. This series of graphs is shown in Fig. 2. From these it was possible to determine the number of seconds that the car could coast and still make the schedule speed for the different length runs specified. These figures of coasting in seconds plotted against the corresponding free running speed in miles per hour give the graphs of Fig. 3.

From an operating standpoint it is advisable not to reduce the amount of coasting time below ten seconds. With the short runs of 427 ft. this requires a free running speed greater than 19¼ m.p.h. With 19½ m.p.h. the amounts of coasting obtained are ten and one-half, twenty and one-half and twenty-four and one-half seconds, respectively, for the different typical runs. These figures when compared with the speed at cut-off and the power input required are most satisfactory.

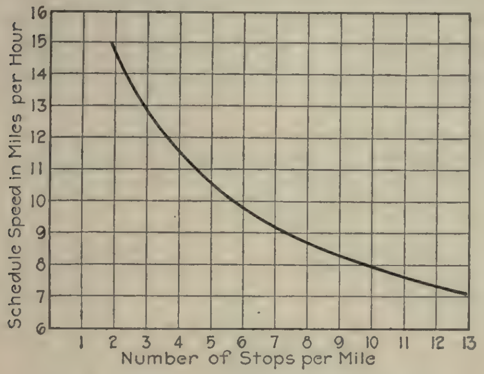


Fig. 1—Relation of Schedule Speed and Number of Stops per Mile

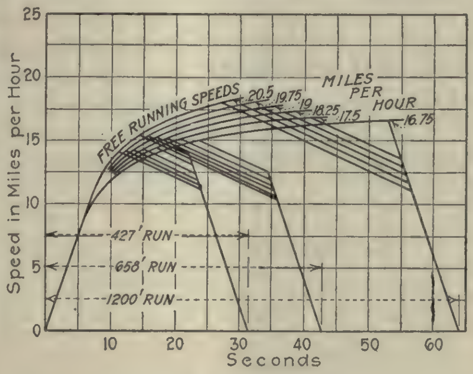


Fig. 2—Variation of Coasting Time with Free Running Speed

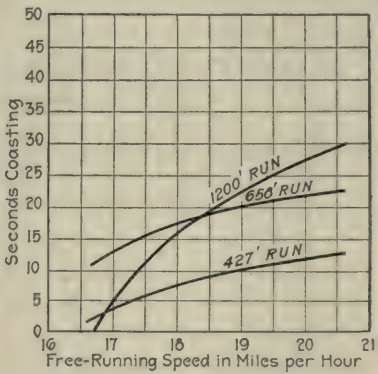


Fig. 3—Relation of Coasting Time to Free Running Speed

GRAPHS SHOWING OPERATING CHARACTERISTICS AND EFFECT OF FREE RUNNING SPEED ON COASTING TIME

The three motors chosen are rated at 40 hp., 55 hp. and 67 hp., respectively, at 600 volts. They are the latest types of ventilated motor but are not arranged for tapped-field control. When we have determined which of these is best suited for the requirements we can make some further comparisons with motors of similar capacity arranged with tapped-field control, and can then decide whether the latter have advantages that will make them more desirable for use in this service.

The first analysis should be kept as simple as possible, however, and the various typical run graphs with non-field-control motors are somewhat simpler to construct than would otherwise be the case.

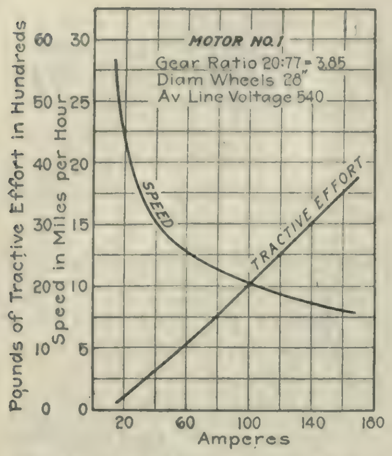


Fig. 4—Motor No. 1—40 hp. at 600 Volts

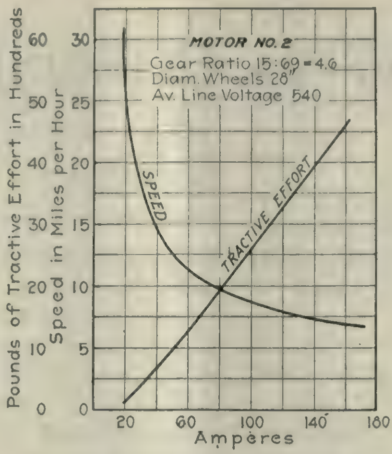


Fig. 5—Motor No. 2—55 hp. at 600 Volts

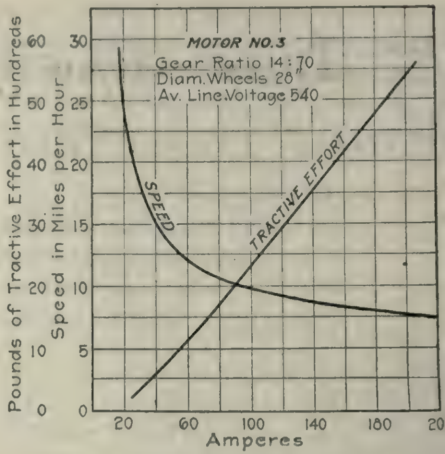


Fig. 6—Motor No. 3—60 hp. at 600 Volts

CHARACTERISTIC CURVES OF NON-FIELD-CONTROL MOTORS

The average lengths of runs for the service we are considering are 1200 ft., 658 ft. and 427 ft., respectively, for the suburban, residence and business sections as given in my April 20 article. Using the characteristic curves for the motors chosen for comparison, I have plotted graphs for speed time, heating current, power input and voltage for each of these typical runs. These are shown in Figs. 7, 8 and 9, and they were constructed by following the methods and calculations described in my previous articles. From these graphs values of heating current power input, average voltage, etc., have been calculated and are given in Table I for comparison. These determine our preliminary selection of a motor. For convenience these motors are referred to as motors Nos. 1, 2 and 3.

Let us first consider the heating currents taken in the three typical runs. A comparison of these shows that the duty on the motors is most severe for the shortes runs of 427 ft., as these runs take from 16 per cen to 26 per cent greater average heating current than th long runs of 1200 ft. It is this service through th business sections with frequent stops that determine the choice of size necessary to prevent overheating Motor No. 1 is evidently too small for the service, as th square-root-of-the-mean-square currents are 40.1 amp. 43.9 amp. and 48.4 amp., respectively, while the con tinuous rating of the motor is but 38 amp. Under th average conditions of service the equipment will be re quired to operate in the most severe service for 37 pe cent of its total mileage. The cooling effect of self ventilation is also less in this service, and for this moto the heating current is 10 amp. more than its continuou rating. This motor, therefore, should not be considere for the service.

TABLE I—COMPARISON OF PERFORMANCE OF THREE MOTORS OF DIFFERENT SIZE, WITH NON-FIELD CONTROL

Motor No.	Horsepower Rating at 600 Volts	Continuous Rating, Amperes	Weight of Motor with Gear and Gear Case, Pounds	Length of Run, Feet	Schedule Speed, M.p.H.	Coasting Time, Seconds	Square Root of Mean Square Current, Amperes	Kilowatt-Hours		Average Volts per Motor
								For Run	Per Car-Mile	
1	40	38	1990	1200	11½	25.2	40.1	0.456	2.01	489
				658	9	20.7	43.9	0.294	2.35	436
				427	7½	11.5	48.4	0.255	3.15	410
2	55	53	2360	1200	11½	23.6	35.4	0.442	1.94	463
				658	9	18.8	37.8	0.278	2.23	448
				427	7½	10.0	41.1	0.241	2.97	427
3	67	60	2630	1200	11½	25.0	38.1	0.452	1.99	493
				658	9	19.2	41.3	0.293	2.35	453
				427	7½	11.0	44.9	0.246	3.04	424

TABLE II—COMPARISON OF PERFORMANCE OF FIELD-CONTRO MOTORS WITH NON-FIELD-CONTROL MOTOR

Motor No.	Horsepower Rating at 600 Volts	Continuous Rating, Amperes	Weight of Motor with Gear and Gear Case, Pounds	Length of Run, Feet	Schedule Speed, M.p.H.	Coasting Time, Seconds	Square Root of Mean Square Current, Amperes	Kilowatt-Hours		Average Volts per Motor
								For Run	Per Car-Mile	
2	55	53	2360	1200	11½	23.6	35.4	0.442	1.94	463
				658	9	18.8	37.8	0.278	2.23	448
				427	7½	10.0	41.1	0.241	2.97	427
4	55	54	2400	1200	11½	29.0	37.0	0.419	1.84	492
				658	9	20.5	39.1	0.265	2.12	453
				427	7½	11.2	42.2	0.238	2.94	433
5	55	48	2400	1200	11½	34.6	41.0	0.421	1.85	467
				658	9	23.1	43.3	0.278	2.23	410
				427	7½	13.0	47.0	0.241	2.97	384

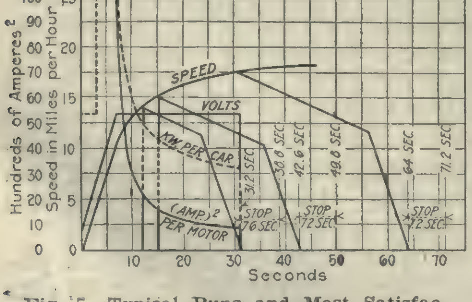


Fig. 7—Typical Runs and Most Satisfactory Operation with Car Equipped with No. 1 Motors

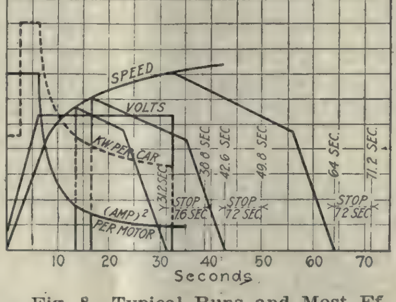


Fig. 8—Typical Runs and Most Efficient Operation with Car Equipped with No. 2 Motors

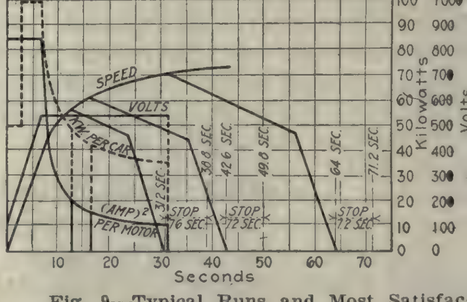


Fig. 9—Typical Runs and Most Satisfactory Operation with Car Equipped with No. 3 Motors

SPEED-TIME AND POWER-INPUT GRAPHS FOR OPERATION OVER THREE TYPICAL RUNS

Both the motors Nos. 2 and 3 will perform all classes of the service without overheating and the square-root-of-the-mean-square current for the most severe run of 427 ft. is but 77 per cent of the continuous rating of motor No. 2 and but 75 per cent of the continuous rating of motor No. 3. Our choice will then lie between these two motors.

Motors May Be Too Large for Economy as Well as Too Small for Safety

Next let us compare the power taken by these two motors. Motor No. 2 gives the most economical operation as its power consumption is from 1.943 to 2.975 kw.-hr. per car-mile, while motor No. 3 takes 1.991 to 3.041 kw.-hr. per car-mile. Motor No. 2 possesses a further advantage due to its size and weight. It weighs but 2360 lb. against 2630 lb. for motor No. 3, or a saving of 540 lb. per car. The weight of the car, which was previously assumed at 39,000 lb. was based on a motor weighing 2727 lb. Of these three motors No. 2 is the best adapted for the service required.

The results obtained in the amount of coasting for the various runs, and the close agreement of this time for the different motors while operating on the same-length run, are due to having the free running speed the same for all motors. The average voltage per motor varies from 410 to 493.

Field-Controlled Motors Most Economical for City Service

To determine the advantages that field-controlled motors might have over the motor selected, I have chosen two additional motors for consideration. Motor No. 4 is the same as No. 2 except that it is arranged for field control, and motor No. 5 is a tapped-field motor of the same size but built by a different manufacturer. The characteristic curves of these motors, arranged to meet the service conditions we are considering, are shown in Figs. 10 and 11, and speed-time, power-input, heating-current and voltage graphs using these motors are give in Figs. 12 and 13. In order to compare their perform ance with motor No. 2 more readily I have tabulate the results in Table II. Both motors will perform th service satisfactorily without overheating, and bot show a decreased power consumption over that of moto No. 2. Motor No. 4 is the more efficient, however, an shows a decrease in power consumption over motor No 2 of about 5 per cent.

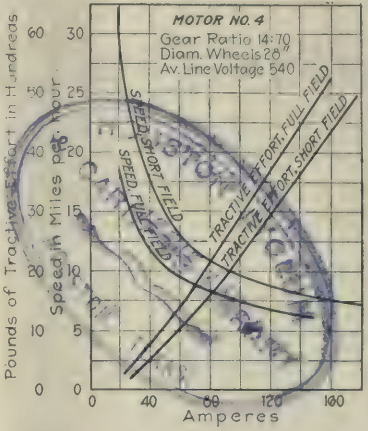


Fig. 10—Motor No. 4—55 hp. at 600 volts

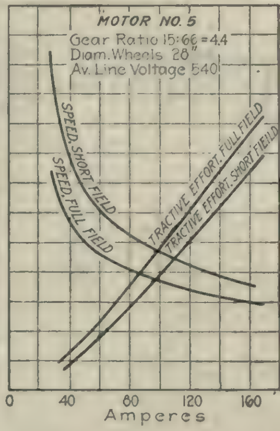


Fig. 11—Motor No. 5—5 hp. at 600 volts

CHARACTERISTIC CURVES OF MOTORS ARRANGED FO FIELD CONTROL

A comparison of the graphs shown in Figs. 8 and 1 indicates the advantages of field control for reducing th rheostatic losses during the acceleration period. Th rate of acceleration is the same in both cases. Wit the tapped-field motor the rheostats are entirely cut ou at a speed of 8.3 m.p.h., in five and one-half second from the starting of the car, while with the non-field controlled motor the rheostats are not cut out till a spee of 9½ m.p.h. is reached, and they remain in circuit fo six and one-fifth seconds. The current taken by th

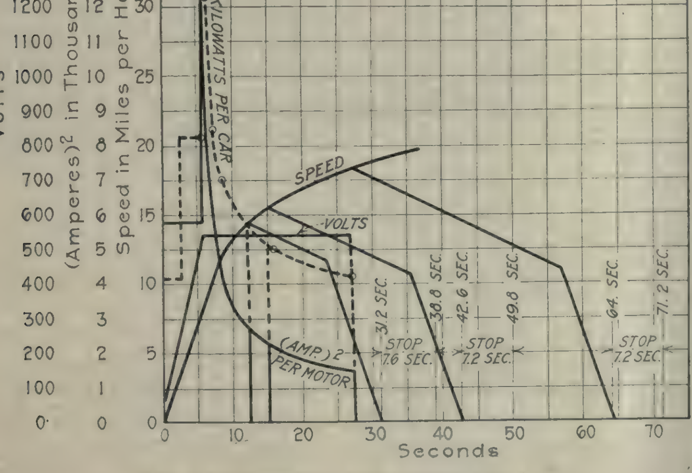


Fig. 12—Operation with Motor No. 4

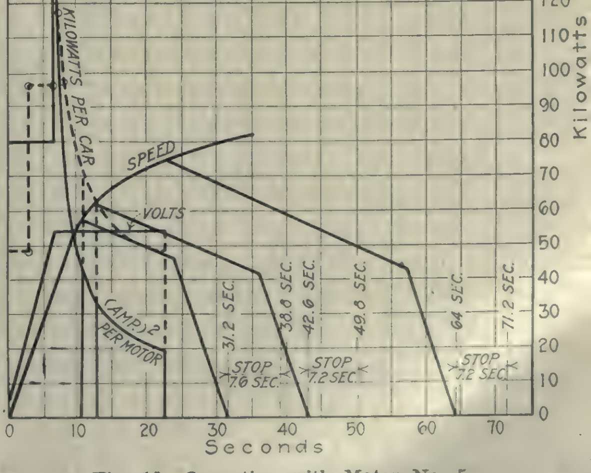


Fig. 13—Operation with Motor No. 5

SPEED-TIME AND POWER-INPUT GRAPHS FOR CARS EQUIPPED WITH TAPPED-FIELD MOTORS

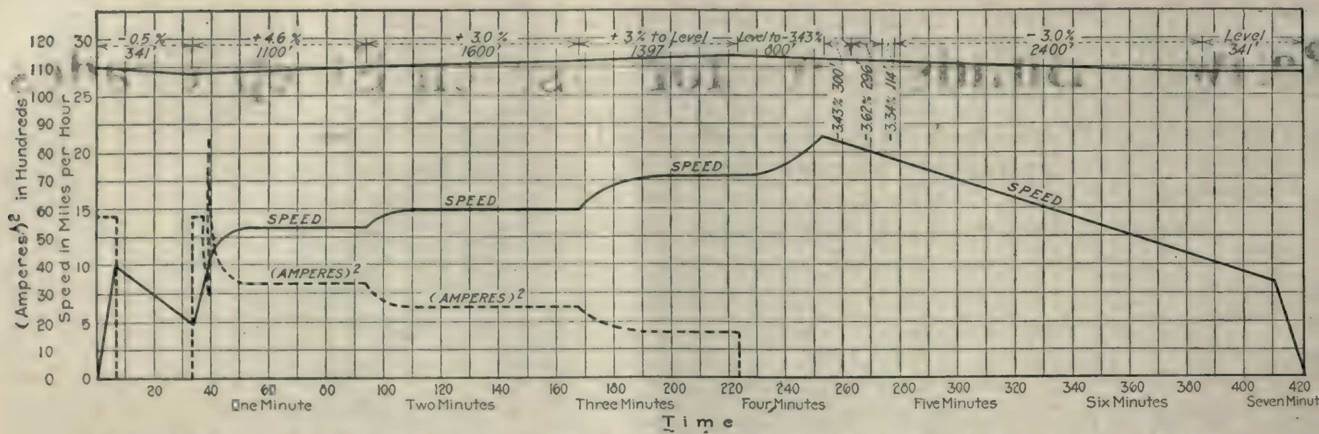


FIG. 14—SPEED-TIME AND POWER-INPUT GRAPHS FOR OPERATION OF CAR IN BRIDGE SERVICE

field-controlled motor is also less during this period, being but 76 amp. as against 84 amp. for the non-field-controlled motor. The reasons for these economies are seen by comparing the motor characteristic curves for these two motors. These show that the speed of the field-controlled motor, with tapped field is about the same as the motor without field control, while its speed with full field is about 25 per cent less. The full field is used in accelerating so the rheostatic losses will be cut out quicker and thus greatly reduced. The tapped field is used for running and so the car is able to attain the same speeds as can be attained with the non-field-control motor.

By the use of field-controlled motors a means is provided for rapid acceleration with a minimum amount of loss in the starting rheostats. The maximum current peak is higher with the tapped-field motor due to the swing that takes place when changing from full to tapped field. The first cost of tapped-field motors is also somewhat higher, but this and the preceding disadvantage are offset by its resulting advantages. Of the five motors considered for this service No. 4 with tapped-field control is the one that should be selected.

Motor Ventilation Is an Important Advance

In the first part of this article I stated that the motors selected for consideration were of the self-ventilating type. In order to determine the resulting advantages of ventilated motors I plotted several graphs for the typical runs we are considering, using non-ventilated motors, and I find that the continuous current rating with ventilation was increased from 10 amp. to 12 amp. with some motors. This permitted the use of the next smaller size of ventilated motor than would have been necessary without ventilation.

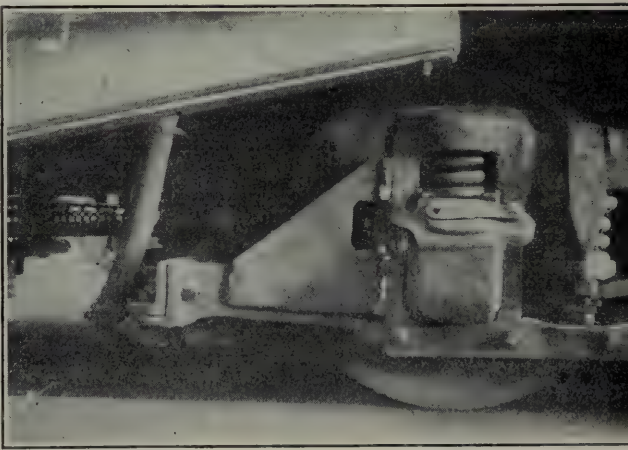
Since the amount of air circulated in a self-ventilated motor depends on the speed of the fan, it follows that in a service with low motor speeds the results obtained are not as great as in a high-speed service with few stops. The consensus of opinion of those who have had wide experience in the operation of ventilated motors seems to be that, in a combined city and suburban service such as we are considering, the modern ventilated motor has an increased rating of from 25 per cent to 35 per cent in sizes up to 55 kw. and from 35 per cent to 80 per cent in larger sizes.

As stated in my article in the April 20 issue of the ELECTRIC RAILWAY JOURNAL, in addition to the service through suburban, residence and business sections t equipments are called upon to operate across bridg with severe grades at each end.

In order to ascertain if motor No. 4, which we ha chosen, will perform in this service satisfactorily I ha plotted the graphs in Fig. 14 for a trip across the mo severe of these bridge runs. From this it is evide that the bridge service is not a limiting condition as r gards the heating of the motors, for the average heati current for this run is but 35.7 amp. The ability of t equipment to stop and start on the grades must be co sidered also, and in this the motors under discussion a satisfactory.

Weld Reinforcement for Truck

THE accompanying illustration shows how F. Maize, master mechanic Portland (Ore.) Railwa Light & Power Company uses the electric welder make a truck stronger than it was originally. This pa ticular type has a penchant for breaking in the low



TRUCK WITH PLATES WELDED ON BOTH SIDES TO INCREASE STRENGTH OF REPAIRED SECTION

side member near the end and just beside the journ box.

In carrying out such a repair, Mr. Maize makes t truck stronger than before by welding on a stiffeni plate along the side frame and the pedestal as shown the illustration. This plate forms a brace in the ang formed between the pedestal and the side frame.

None of these welds has disclosed any evidence further fracture.

Railway Builds Cars for Use on Steep Grades

The Omaha & Council Bluffs Street Railway Puts in Service Forty Semi-Steel, Home-Built, 34,000-Lb. Cars—They Were Designed for Prepayment Service, Seat Forty-five Persons and Operate on a Maximum Grade of 10½ per Cent

THE Omaha & Council Bluffs Street Railway, which operates over 163 miles of track in Nebraska, chiefly in the city of Omaha and, as the name indicates, connects this city with Council Bluffs, Ia., has recently added to its stock of more than 450 cars by building forty light-weight, semi-steel cars in its shops.

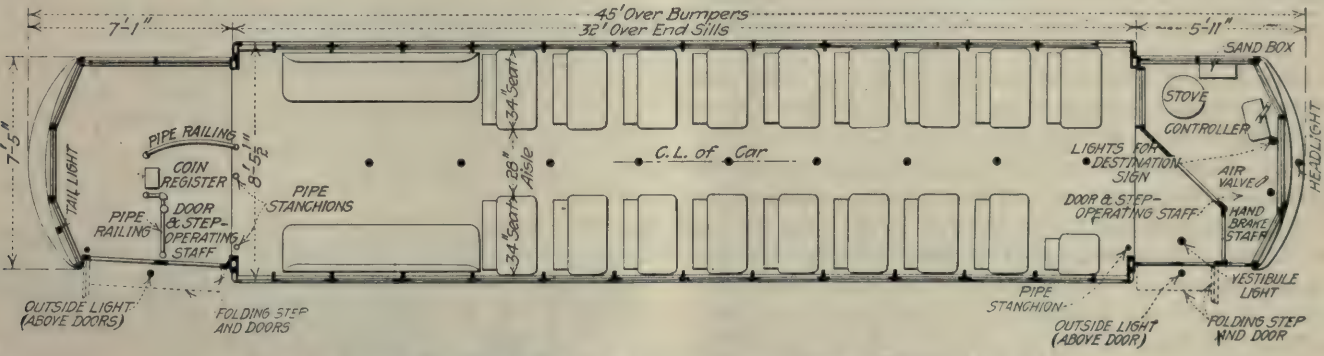
These cars, as indicated in the accompanying plan, are 45 ft. over all in length, 8 ft. 5½ in. over all in width, 11 ft. 3½ in. from top of rail to top of roof, and weigh completely equipped approximately 34,300 lb. The cars were built as light as service requirements and maximum grades of nearly 10½ per cent would permit. The design is for prepayment service, single-end operation and provides for a seating capacity of forty-five passengers.

SIDE SHEATHING, WITH STIFFENING, FORMS GIRDER

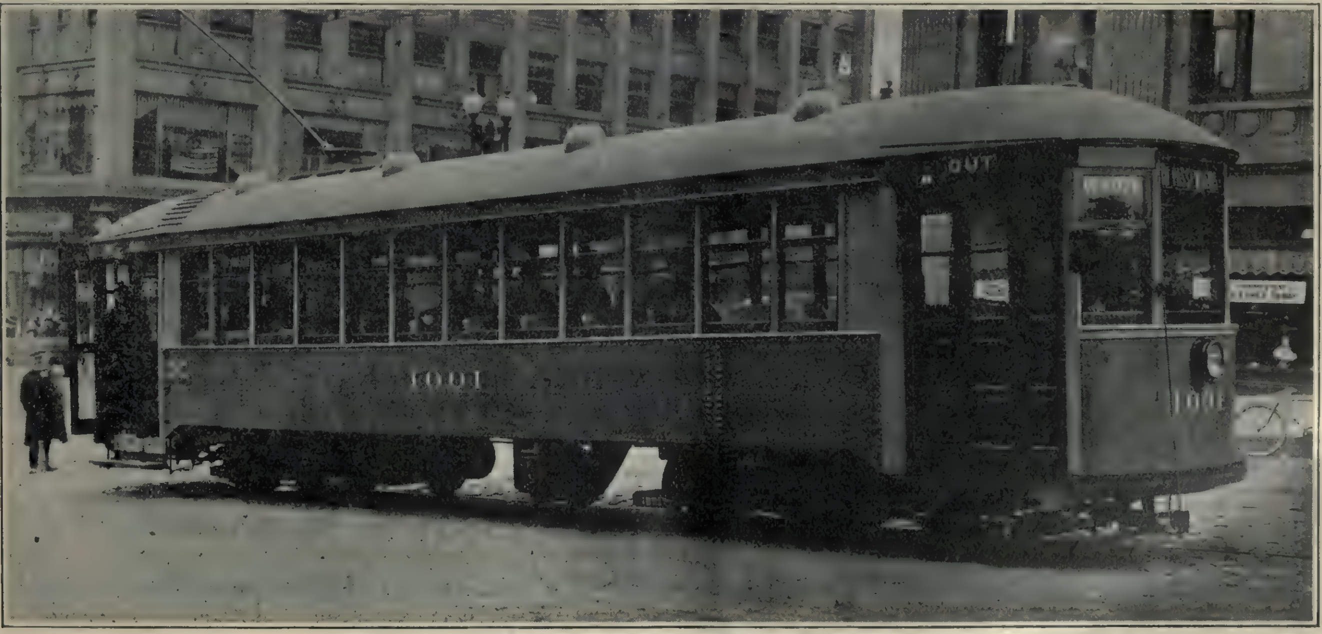
The underframe construction consists of side sills formed of steel angles, 2¼ in. x 2¼ in. x $\frac{3}{16}$ in., with 5-in., 6½-lb. channels for the cross sills and two steel angles, 2 in. x 2 in. x $\frac{3}{16}$ in., and one plate, 14 in. x ⅛ in., for the end sills.

The body corner posts are made of steel angles, 3 in. x 2 in. x ¼ in., and the intermediate posts are of wood. The carlines are of wood riveted to the tops of the side posts, and the side sheathing below the belt rail is $\frac{3}{32}$-in. structural plate, 32 in. deep, reinforced vertically by stiffener angles, 1¼ in. x 1¼ in. x ¼ in. and horizontally by stiffener angles, 1 in. x 1 in. x ⅛ in. The vestibules are sheathed with wood and the letterboards are also of wooden construction. The roof is of wood, $\frac{7}{16}$ in. thick covered with canvas. The side sill angles are connected at the ends by 6-in., 8-lb. steel channel bumpers.

Special attention is called to the rake given to the sides from the window sill to the water table. This provides an adequate overhang of the water table with maximum width of aisle space.



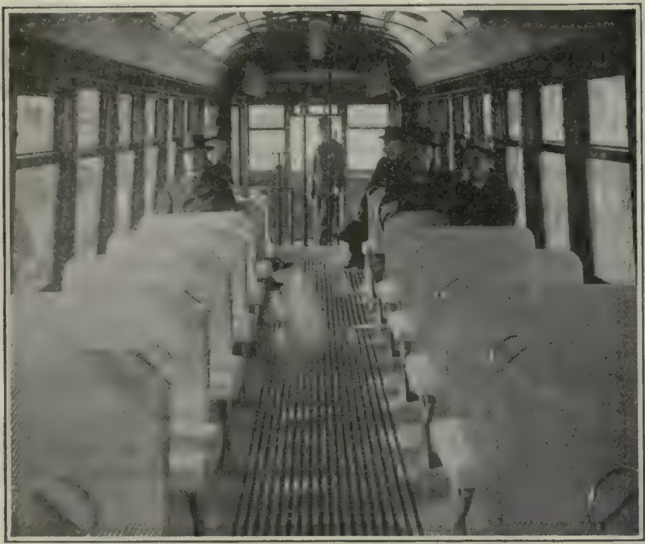
PLAN OF CAR BUILT BY OMAHA & COUNCIL BLUFFS STREET RAILWAY



LIGHT-WEIGHT SEMI-STEEL CAR BUILT IN OMAHA SHOPS

The upper steel sashes of all side windows are stationary, while the lower sashes lift into roof pockets. Heavy wire grills are placed outside the windows and each window is provided with a Pantasote curtain. The headlining is of Agasote and the car interior is finished in cherry. The floor is of ⅞-in. yellow pine with maple strips for the aisle matting.

Double out-folding entrance and exit doors and folding steps, manually operated according to the American Car Company's design, are provided at the rear, and a single folding exit door and step at the front end. There are thus door openings of 5 ft. at the rear and 2 ft. 4 in. at the front.



INTERIOR ARRANGEMENT OF OMAHA HOME-BUILT CAR

The conductor's station is on the rear platform, and fares are collected and recorded from entering passengers by means of the International fare box and register. The arrangement of the rear platform railings is shown in the drawing. The bulkhead arrangement at each end provides successive steps from top of rail to car floor of 14 in., 13 in. and 10½ in., with a 2-in. ramp from the end of the body sill to the end of the bolster. The seats are rattan, with a single pressed-steel pedestal at the aisle end of each cross-seat, the opposite end being fastened to the wall with brackets. In addition to the cross-seats there is a 7-ft. longitudinal seat on each side of the rear end, nine 34-in. transverse seats on the left side and one 17-in. transverse and eight 34-in. seats on the right side. A 28-in. aisle is provided between the transverse seats, and a 4-ft. 4-in. aisle between the rear longitudinal seats. Sanitary hand straps for standing passengers are furnished in this rear part of the car.

In the roof are eight American Car Company's ventilators, four along each side. The lighting system includes ten 36-watt lamps, arranged in series along the center line of the roof, in Electric Service Supplies Company's safety car lighting fixtures, with Gleason-Tiebout Company's "Camia" reflectors. There are two similar units on the rear platform and two on the front platform. On the same circuit are one lamp equipped with a Benjamin steel reflector, on the outside of the car above each door, two lamps in the front destination sign and one tail lamp. These lamps, with fuses on each circuit, are controlled from a cabinet in the front vestibule by means of 10-amp. snap switches. The rear side destination sign is illuminated from the interior car lighting. The signs are of the Electric Service Supply Company's hood type, the signal system is the "Faraday," with passenger's button on each side post, and the headlight is a "Golden Glow."

The front platform, excepting the exit passageway, is shut off by an Agasote bulkhead partition open at the top and bottom, with a grating in it behind the stove. A swinging door is provided for the motorman.

In the motorman's compartment are a Westinghouse K-35-G-2 controller, an Allis-Chalmers AA-7-a airbrake valve, a Dayton handbrake staff, the front door and step operating staff, a home-made sheet-iron sand box, equipped with Keystone sand trap, and a Peter Smith hot water heater.

The car bodies are mounted on Brill 76-E trucks, with 4-ft. 6-in. wheelbase and 30-in. cast-iron wheels on 4½-in. axles. There are four Westinghouse 506-C-2 motors, outside hung, geared 14 to 90, with solid gears. Other specialties of the car equipment include Tomlinson couplers, Anderson slack adjusters, H-B lifeguards and Earll trolley catchers.

Home-Made Lantern Rack and Carrier

IN THE Salem (N. H.) shops of the Massachusetts Northeastern Street Railway the home-made lantern rack shown is used. The rack is composed of three 8-in. x 1-in. discarded car running boards, with holes cut to hold the lower part of the lanterns. These are spaced just far enough apart to prevent striking in quick insertion and withdrawal. When mounted on the wall in three rows about 2 ft. apart vertically, storage space for about seven dozen lanterns is secured in a horizontal distance of about 25 ft. To facilitate carrying the lanterns out of the shop to passing cars, holders like that shown in the inset, Fig. 1, have been constructed from discarded car-sign stock. Each holder carries four lanterns and is fitted with a strap-iron handle. The lamps are seated in the holder far enough to bring their center of gravity down well below the tipping point. When the holders are not in service they are conveniently mounted on pins carried on a horizontal wooden strip fastened into the carhouse wall above the lantern storage rack.

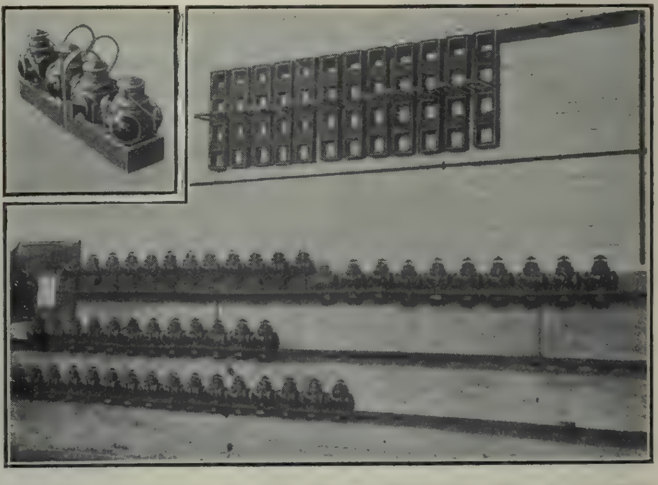


FIG. 1—CARRIER FOR FOUR LANTERNS FIG. 2—RACKS FOR LANTERNS AND CARRIERS

Depreciation and Rate Making

The Use of An Undepreciated Value With Sinking-Fund Accruals for Depreciation Is Not Only Justifie by Precedent and Correct Accounting Principles but Is Desirable On the Ground of Public Policy

By L. R. NASH
Stone & Webster, Boston, Mass.

THE paper on "Some Pitfalls in Regulating Depreciation" by John Bauer in the Aug. 24, 1918, issue of the ELECTRIC RAILWAY JOURNAL invites a few words of comment upon a much-discussed but little understood subject. Professor Bauer takes as his text a rate decision of the Colorado Public Utilities Commission, rendered in October, 1917, in which an undepreciated value is determined as a rate base in connection with a sinking fund accrued for depreciation reserves. He fears that this decision will become a bad precedent in rate valuations, and that the commission has been led into serious error and confusion in its arguments.

COLORADO DECISION NOT NOVEL

While the commission in the decision in question may not have stated its case in the clearest possible way, it has described and adopted a procedure which is by no means new in regulatory practice, so that the decision does not harbor the menace to utility patrons which is apprehended. The first leading case in which the same principles were established was decided by the Second District New York Commission in April, 1913 (Fuhrmann vs. Cataract Power & Conduit Company, 3 N. Y. (II) P. S. C. 656,714). The opinion in this case by Commissioner Stevens discusses clearly and at considerable length the advantages of an undepreciated value in connection with a sinking-fund accrual over a depreciated value with a straight-line accrual. Mr. Stevens' opinion, from which there was no dissent, agrees fully with that in the recent Colorado case, that either method, if properly and consistently applied, is perfectly fair to all parties at interest. Decisions from other commissions in more recent years have embodied the same principles, those of the California commission being most noteworthy.

OUTLINE OF COLORADO CASE

A careful reading of the Colorado decision (P. U. R. 1918 B 86) does not disclose the uncertainties and inconsistencies to which Professor Bauer refers. The utility involved was of comparatively recent origin, and it was possible to determine the original purchase price and the cost of the comparatively large subsequent additions to the physical property with an unusual degree of accuracy. Differences between the engineers of the commission and of the utility in their determinations of the rate base were confined very largely to overhead and intangible elements. Furthermore, this utility had been operating under the present public service law during the major part of its history and, if it had conformed to the accounting requirements of this law, it had annually set aside an accrual for depreciation on the sinking-fund basis embodied in its rate case. The Colorado act is one of the few that prescribe depreciation accounting procedure with such definiteness. The matter is not left to the discretion of either commission or utility. It should therefore be assumed that the commission in deciding the rat case in question simply fixed a rate base which is consistent with the utility's established accounting practice

If this preliminary statement of the facts in thi case serves to clear up some of the criticisms of th commission's procedure, there will still remain severa features of Professor Bauer's discussion which nee attention. They may be summarized as follows: (1 His inability to see the consistency of an undepreciate investment with a depreciated physical property; (2 The contention that an investment with a sinking-fun accrual for depreciation should sometimes be depreciated; (3) A denial of relationship between valuatio and future methods of accruing for depreciation.

MISTAKES OF ECONOMISTS

It is not surprising that people unfamiliar wit public utility matters should instinctively think abou depreciation in connection with value, because thei conception of value is ordinarily associated with sale or taxation. It is a matter of concern that there ar modern students of economics who still contend tha the public can only be protected from the greed c public utilities by scaling down their investment i rate cases in proportion to the theoretical physical condition of the property. The unvarying and successfu practice of public service commissions for a generation the well-known "hen" analogue, the numerous books papers and exhaustive reports on the subject have apparently failed to convince such students that the rat base in modern regulatory practice may be quite different from the older concepts of value. It is unfortunat that "value" has been admitted to rate case nomenclature, even though it may be necessary in associate litigation.

Public utilities should be distinguished from othe industries by their unlimited life. Other enterprise may serve the purpose for which they were create and liquidate. Their average life is, in fact, only very few years. Public utilities, on the other hand quickly become an integral part of the community lif and their removal would be a calamity not to be contemplated. In the course of time they reach a stabl physical condition. Daily some elements are worn ou or become obsolete and are replaced; daily also new elements are added for expansion of service. A typica public utility is neither new nor old. Its efficienc does not decrease with the years but rather tends t increase with its more modern, new elements. Th investor puts in his money expecting it to remain indefinitely, at any rate not to be returned on the installment plan. He trusts that the utility will protect his investment by maintaining and renewing the physical property. He assumes that such funds as are needed will be provided for that purpose but he is not concerned with the specific method by which they are accumulated as long as he is not affected.

Contrary to the popular impression, which also seems to have crept into Professor Bauer's paper, the utility is by no means synonymous with its investors. Its affairs are to a limited extent directed by certain investors, but they are also subject to the control of the community served and, in most cases, are under the supervision of a public service commission. In a sense, the utility is a trustee, furnishing to the public such service as the latter cares to pay for, and paying to the investor a return on funds placed in its hands. The income received by this trustee and its apportionment to service, taxes, replacement, returns, etc., may be very largely fixed by the commission, which thus also intervenes between investor and public.

UNDEPRECIATED RATE BASE—SINKING-FUND ACCRUAL

From the many available discussions and authorities with voluminous tables and formulae it should be perfectly clear that in the long run it makes no direct difference to either investor or patron whether the rate base is depreciated or not, provided the appropriate depreciation accrual method be correctly used. There are periodic differences which may affect the patron when depreciated value is used, and these differences tend to retard the development of the business in its early years. They would hopelessly confuse the average patron if consistently recognized in rate adjustments. In a rate case, requiring the fixing of the percentage of accumulated depreciation by a commission, the difference which would almost inevitably exist between the opinion of the commission and the accrual practice of the utility would work hardships upon either the utility or its patrons.

Irregularity in rates, uncertainties and injustice are all avoided by the undepreciated rate base and a sinking-fund accrual. Nor are there any circumstances under which the rate base can be properly depreciated when the sinking-fund accrual is used. If, as assumed in the paper, the depreciation reserve is invested in the property instead of elsewhere—and this is the usual procedure—the total investment cannot be scaled down for rate-base purposes, because the invested depreciation reserve must earn a return for its own accretion. The investor is entitled to a return on his own actual investment, but not, of course, upon the depreciation reserve investment. The patrons pay a return upon both these elements in the rate base. If the investment is scaled down, the adequacy of the depreciation reserve is impaired. Proper accounting would not permit any confusion between investors' funds and the depreciation fund, even though they should be represented in one property account.

It is not difficult to show by a simple illustration that the sum of return and depreciation annuity is the same whether a depreciated or undepreciated value is used. A property without growth ultimately reaches a theoretical condition of 50 per cent depreciation. With due allowance for salvage value and the usual consistent growth in utility property, the average actual condition should not be lower than 75 per cent. On the assumption of a useful life of twenty years and a fair return of 8 per cent, the patrons would pay in the case of depreciated value 8 per cent on 75 per cent of the investment or 6 per cent on the whole, plus 5 per cent for depreciation, or 11 per cent for both. In the case of undepreciated value they would pay 8 per cent on the full investment plus the equivalent sinking-fund accrual of about 3 per cent, or the same 11 per cent total. At certain stages in the utility's history, with other rates of return or with a different average life, the circumstances of equality would be different, but always excesses and deficiencies would in the long run offset each other. The differences would be wholly due to the irregularities arising from the use of varying depreciated values. Clearly if such values serve no useful purpose, they should be avoided.

Perhaps suspicion of the undepreciated rate base procedure lies in the possibility that greedy investors may appropriate more than their share of the return on the total investment, leaving inadequate accumulation in the reserves. Without restraint it is possible that they would go still further and pay out the entire accrual for depreciation in dividends. It is one of the functions of the public service commissions to guard aginst such diversions, through accounting instructions, reports and investigations. If such means are not effective or have not been established long enough to cause the accumulation of suitable reserves, the commissions have ample authority to compel necessary maintenance and replacements of property. It thus appears that the public is protected against excessive charges and inadequate service.

PRESENT VALUATION AND FUTURE DEPRECIATION

As to the relation between present valuation and future depreciation accruals, it is true that relationship is not necessary, but it is by no means absurd. With an undepreciated rate base one almost instinctively expects to use a sinking-fund accrual for depreciation. A straight-line accrual would involve the unusual practice of crediting income with the return on invested reserves. With a depreciated rate base one similarly expects to accrue for depreciation on the straight-line basis. The substitution of a sinking-fund accrual, while possible, would involve a change in depreciation accounting methods and the determination of a new rate of accrual which would provide for remaining value in remaining life expectancy.

In spite of the above statements, the possibility is here pointed out of conducting a rate case without necessary reference to actual past or future depreciation accounting methods, other than to establish their adequacy. If the actual, undepreciated, total investment is taken as the rate base and a fair return allowed thereon plus a sinking-fund accrual for depreciation, substantial justice will be done to all parties at interest. If in the past the utility in question has paid continuously a fair return on the full investment and accumulated a full straight-line depreciation reserve, a rate decision on the proposed basis might properly reduce the future accruals, even to the point that the future sinking-fund accruals would be only the amounts necessary to provide for remaining value in remaining life expectancy. On the other hand, for equal accuracy the opposite procedure should be followed in the case of deficiencies in past accruals. No useful purpose would be accomplished by changing the rate base instead of the depreciation accrual.

Briefly, the accurate application of this method in a rate case requires the determination of revenue sufficient to provide for operating expenses, taxes, a fair return upon the full, actual investment, and a depreciation accrual on the sinking-fund basis to accumulate in the years of remaining life of the various property elements that part of their cost not already accumulated. To these factors should be added if necessary a return upon past deficiencies in fair return or an amoritzation thereof. A utility subject to rate regulation on this basis might still follow the less complex straight-line method of accrual in its actual accounting, the result being that there would be deficiencies in return in the early years and excesses in later years with respect to specific property elements. When the property as a whole had reached maturity, with elements of widely varying ages and length of useful life, the combined differences would not be appreciable.

DEPRECIATION SHOULD BE PROVIDED FOR

It is the regular duty of the public service commissions to see that suitable provision is made for depreciation. Under their supervision, accruals may be decreased or increased from time to time as actual useful life is found to be greater or less than previously estimated. As long as obsolescence and inadequacy play their present important part in the usefulness of utility elements, great refinement in estimating accruals or present condition is futile. If the latter can be entirely avoided, the problem of rate adjustments is materially simplified. In view of this simplification and the equal fairness of rate regulation based upon undepreciated rather than depreciated values, it hardly seems necessary to find fault with the utilities for favoring the more straightforward and understandable method. Undoubtedly one motive in the choice is a desire to relieve the apprehension aroused among investors by the strange doctrines which have been propounded in this particular field since the advent of regulation.

To a surprising degree, academic discussion fails to recognize that most public utilities are constantly growing and needing new capital. The strict regulation and frequent criticism of utility activities, the "fair return *and no more*" (writer's italics) sentiment, reiterated in the paper under discussion, all make it difficult for utilities to compete successfully in the money market for new funds and to hold what they already have. The resulting increased cost of money means a higher ultimate cost of the service rendered. An adherence to established and tried business principles instead of experimentation with unseasoned theories would do much to restore confidence in public utilities as a safe investment, to improve the service rendered and to reduce its cost.

LETTERS TO THE EDITORS

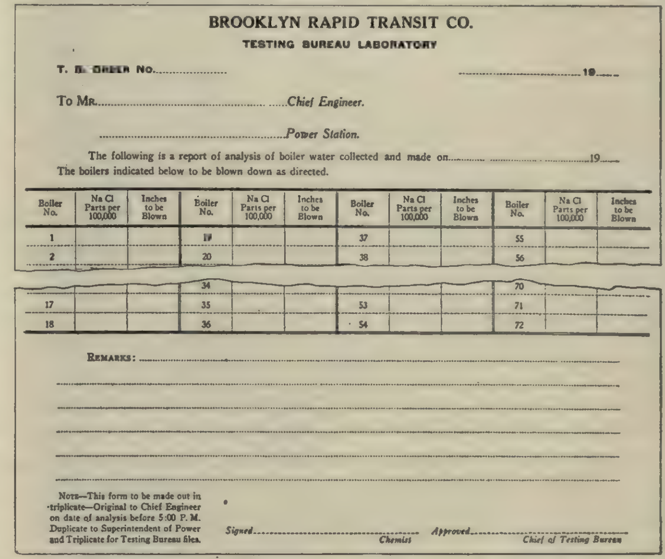
Testing and Treating Power-Plant Feed Water

BROOKLYN RAPID TRANSIT COMPANY

BROOKLYN, N. Y., Sept. 8, 1918.

To the Editors:

One of the readers of the ELECTRIC RAILWAY JOURNAL has written me asking to be referred to a text-book that will explain the methods of testing boiler feed water for salinity, hardness, alkalinity, etc. He also inquires as to the manner of taking samples of boiler water and schedule of testing. These questions were raised by reading my article on "Testing and Treating Power-Plant Feed Water" in the ELECTRIC RAILWAY JOURNAL of April 20. As there may be other readers of the paper who are interested in these points I am sending you the substance of my reply to his inquiry for such use as you may care to make of it.



BROOKLYN RAPID TRANSIT CO.

TESTING BUREAU LABORATORY

T. B. ORDER NO.................... ....19....

To MR.. ......*Chief Engineer.*

....*Power Station.*

The following is a report of analysis of boiler water collected and made on............ ....19.....
The boilers indicated below to be blown down as directed.

Boiler No.	Na Cl Parts per 100,000	Inches to be Blown	Boiler No.	Na Cl Parts per 100,000	Inches to be Blown	Boiler No.	Na Cl Parts per 100,000	Inches to be Blown	Boiler No.	Na Cl Parts per 100,000	Inches to be Blown
1			19			37			55		
2			20			38			56		
			34						70		
17			35			53			71		
18			36			54			72		

REMARKS: ....

NOTE—This form to be made out in triplicate—Original to Chief Engineer on date of analysis before 5:00 P. M. Duplicate to Superintendent of Power and Triplicate for Testing Bureau files.

Signed.. *Chemist*

Approved.. *Chief of Testing Bureau*

FORM USED FOR ASSEMBLING FEED WATER TEST DATA

The book "Examination of Water" by William P. Mason contains valuable information on pages 18, 19 and 20, concerning the test relationships which distinguish between bi-carbonate, normal carbonates and hydrates in water. There is also much of value in the book "Test Methods for Steam Power Plants" by Edward H. Tenney. The chapter on water for boiler feed purposes contains, on pages 79 and 80, a discussion of the determination of chlorine. There are available, as a matter of fact, many references covering the matter.

Boilers of the multiple-drum type sometimes show large differences in the concentration of water in the several drums. When water for sampling purposes is taken from the mud drums of such boilers, excellent average concentration values are obtained. Average values, however, are not of first importance. When differences of concentration occur in the several drums of a multiple-drum boiler it is of urgent importance to determine by testing the maximum concentration value, since it is the maximum value which is most in need of control.

One way of taking water from a boiler drum is by means of a tee on the water column blow-down line, but this is not the best practice. When such a line is "blown" a considerable amount of steam comes down from the steam space in the water column, and this steam condenses in the line and makes the water show salinity which is too low. It is much better to have steam-drum sampling lines entirely submerged.

Another matter which must be kept in mind is that when water is sampled from a line part of it flashes into steam on account of the high temperature of the water. If this is allowed to occur to any appreciable extent it makes the salinity too high. The proper way is to blow the line and then shut off the valve and allow it to remain shut for a sufficient time to cool the water in the line by radiation. Then if the valve is merely "cracked" open, a sample of water may be obtained which will show the true salinity of the drum water.

Boilers fired with underfeed stokers are apt to need more frequent sampling than where the average steaming rate is not high, and samples taken once a day may not be too frequent. It all depends, of course, upon the quality of the feed water. If make-up water is of indifferent quality, or if surface condensers are used and trouble is experienced with leakage of salt water into the hot-wells, frequent testing of the boiler water is desirable. The accompanying printed form shows a scheme for listing salinity values of boiler water with accompanying recommendations as to the numbers of inches of water, measured on the gage glass, which should be blown off. The recommendations for blowing are so proportioned as to reduce the salinity of the boiler water to some suitable standard value. Where the salinity is found greatly to exceed the chosen standard it is necessary to blow in installments. The effect of salt introduced when the water level is pumped up after each installment of the total blow should be taken into consideration, at any rate it should be considered if the salinity of the feed water is other than quite low.

H. LE H. SMITH,
Chief of Testing Bureau.

How to Base Fares According to Distance

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Sept. 9, 1918.

To the Editors:

To provide a basis for charges on the zone system, why not have either:

(a) Each car equipped with a mileage register which would show the total distance traveled for each trip; or

(b) Each car equipped with a large clock indicating the time traveled; the clock to be adjusted so that it operates only when the car is in motion?

The conductor could then issue a ticket to each passenger when he enters the car, punched to indicate either the place or the time of boarding. The fare would then be collected when the passenger left the car and would be based upon the distance traveled as shown by the punching on the ticket. For example, suppose the fare for a 10-mile run, which has a running schedule of 100 minutes is 10 cents or 1 cent per mile. If the passenger boarded the car at any point between the first mile and the second mile and left the car at a point between the sixth and seventh mile, or got on at any point within the first ten minutes after the car left the terminal and left the car at any point between the sixty and seventy-minute time sector, his fare in either case would be 6 cents. By such a plan, there would be a charge proportioned to the distance traveled and the cost of operation. In addition to the foregoing, a "readiness to serve" or minimum fare charge should be made for any distance traveled under 2 miles. This minimum charge might be as low as 2 cents.

It is believed that such a scheme would not be difficult to inaugurate, the public being already educated to the charge-per-mile basis, and, further, it should not be difficult to form public opinion in favor of a plan that can be shown will give fair treatment of all.

A. H. MASTERS,
Assistant to Sales Manager

AMERICAN ASSOCIATION NEWS

Three War Board Bulletins This Week

UNDER date of Sept. 16, the American Electric Railway Association War Board has issued bulletins Nos. 30 to 32.

The first relates to the operation of the draft and contains the text of a letter, dated Sept. 9, from Provost Marshal General Crowder to employers generally. Included are statements from the War Industries Board and the United States Railroad Administration bearing upon the situation.

Bulletin No. 31 is a reprint of the foreword to Circular No. 20, Preference List No. 2, War Industries Board, making clear the basis for the determination of priorities. Electric railways and related manufacturers are listed by the Board in Class II.

The third bulletin calls attention to the restrictions upon non-war construction, as covered in Circular No. 20, issued by the priorities division of the War Industries Board. Chairman McCarter points out that the priorities division construes this bulletin to apply to all extensions, improvements, repairs, etc., of electric railways.

National Electrical Safety Code Now Under Revision

THE present edition of the National Electrical Safety Code designated as Circular No. 54 of the Bureau of Standards has been exhausted, and before reprinting the text of the rules will be revised. This revision is now under way and the Bureau of Standards is anxious to secure from all interested parties comments and suggestions for changes in, or for additions to, the present rules which will reduce accident hazards. These changes or additions must be reasonable and practicable, and they should be supported by citation of specific instances or other evidence when possible. They should be addressed to the Bureau of Standards, Washington, D. C.

A list of proposed changes to Part 3 of the Safety Code has already been prepared and copies have been sent to the committees of technical and utility associations, state commissions and others who have been cooperating with the bureau in the formulation and revision of the rules. Similar lists of proposals for the other parts of the code are now being prepared.

I. C. C. Lays Down Valuation Principles

Decision on Texas Midland Upholds Single Sum Value—Original Cost Will Be Reported as Fully as Possible

IN ITS recent report on the valuation of the Texas Midland Railroad the Interstate Commerce Commission—five years after the passage of the federal valuation act—has taken the important step of passing upon a number of moot points. The Texas Midland case is the first one in regard to which the commission has rendered a report even approaching a final determination of value, and with respect to fundamentals it is therefore a test proceeding.

A perusal of the entire report will be advisable for those interested in utility valuation work. The details are too voluminous to be reproduced here, but an indication of the scope of the decision can be given through a mention of some of the findings. These are as follows:

Single Sum

The valuation amendment authorizes the commission to find a single sum as the value of the common carrier property for purposes under the act to regulate commerce; and the commission will ultimately make such finding as to the property of each carrier, supplementing tentative valuations already made in which a single sum is not stated by such findings.

Original Cost

Original cost to date, which generally cannot be ascertained from accounting records alone, will be reported as fully as possible from the best available evidence in each particular case. When the original cost of portions of the common-carrier property, but not of the whole, can be stated, the ascertained facts will be reported; when the cost of no portion of the property can be identified, the carrier's investment account will be shown. Estimates will be resorted to, within comparatively narrow limits, as to minor portions of the property, the cost of which can not be ascertained from records.

In requiring a report as to the original cost to date of "each piece of property" owned or used by a carrier, the act can not be narrowly construed. A reasonable construction requires that original cost should be reported in all reasonable detail, and the words refer to various sections of the railroad, rather than the individual ties, rails and similar elements.

Cost of Reproduction

Cost of reproduction new of the common-carrier property is ascertained upon the assumed basis of the non-existence of the railroad while all other conditions in the same territory were taken as existent on valuation date. The most practicable and economical construction program is employed, and to an inventory of items making up the physical property are applied cost prices fairly representative of conditions on valuation date, with the addition of the estimated cost of placing the items in position as of valuation date, and certain overhead charges.

In ascertaining the cost of reproduction new the commission is not to ignore expenses which would be incurred by reason of the fact that the physical plant, other than land, would have to be built, and is not limited merely to the reporting of an inventory value.

No allowance is made in the estimate of cost of reproduction new for contingencies as such, but the quantities and prices employed reflect various construction contingencies and fairly represent the amount of money necessary to reproduce the identical property.

The percentage plan of stating engineering in the cost of reproduction new is adopted. In stating the cost of reproduction new by the percentage method engineering should be computed on the amount of the investment in the road accounts, exclusive of engineering and land.

The percentage method of estimating general expenditures, other than interest during construction, is adopted in determining the cost of reproduction new, and the percentage adopted in the present case is applied to the road accounts, exclusive of land.

In estimating cost of reproduction new, the property to be reproduced is taken as the existing property as it was when put into its present service; and if secondhand materials were used, the cost of reproduction new is estimated for the same kind of materials in the same condition as when installed.

Interest During Construction

In estimating interest during construction, for the purpose of stating the cost of reproduction new, it has been assumed that the credit available is good and uniformly the same and that money is obtainable at the same rate of interest and supplies can be purchased at equally advantageous prices; 6 per cent per annum is assumed as the interest rate and is taken as covering the cost of obtaining money.

The period used in determining interest during construction in estimating the cost of reproduction new is taken at one-half of the estimated construction period required for reproduction, plus three months, as to road and general expenditures; and at three months for equipment.

Working Capital and Land

Materials and supplies and cash on hand are not included in the estimate of cost of reproduction new; but the amounts on hand, as shown by the carrier's inventory and its general balance sheet, are stated in the tentative and final valuation

The present value of the lands owned or used for common carrier purposes is stated by ascertaining the number of acres and multiplying this acreage by a market value determined from the present fair average market value of similar adjacent and adjoining lands, due allowance being made for any special value which may attach by reason of the peculiar adaptability of the land to railroad use.

Nothing additional is added for the expense of acquisition, for severance damages, for engineering, and for interest during construction. The reproduction cost of carrier lands, and the present cost of condemnation and damages or of purchase, of a carrier's lands, are not estimated.

Depreciation and Appreciation

In estimating the cost of reproduction less depreciation depreciation has been treated as covering the lessening i the number of units of capacity for service as compared with those existing in the same elements when installed and upon ascertaining what part of the remaining capacit for service remains, the depreciation which has alread accrued is subtracted from the cost of reproduction nev and the remainder is given as the cost of reproduction les depreciation. Due consideration is given to existing salvag or scrap value. Depreciation is not taken merely as th equivalent of deferred maintenance or loss of service eff ciency.

While the valuation act evidently intends to require statement of all the cost values and other circumstance which might bear upon the value of the property, at leas for rate-making purposes, and appreciation is a fact whic may affect the final value of the property, the record in th present case does not warrant any definite finding as t either the cost or the value of such appreciation as ha resulted from maintenance, operation and the effects o time upon the roadbed.

Other Elements of Value

The finding in the tentative valuation that "no othe values or elements of value were found to exist" is ap proved upon the record in the present case, in the light o the fact that in the cost of reproduction new and the cos of reproduction less depreciation figures requisite consider ation was given to the fact that the property constitute a railroad and is doing business, and is not merely an ag gregate of materials.

W. L. Davis, auditor Lehigh Valley Transit Company has issued to conductors and agents on this propert a calculating table in handy pocket form for use i making computations with the new .6-cent fare uni

Brooklyn Unionists Fight Discharge

Former Employees of B. R. T. Elevated Subsidiary, Discharged for Serious Violations of Rules, Allege Discrimination—Drag War Labor Board Into the Case, Despite Absence of Controversy with Remaining Men

A CHARGE that labor agitators are trying to make use of the War Labor Board to create industrial discord in Brooklyn was made on Sept. 19 by President T. S. Williams at a hearing before this board. The case concerned allegations of discrimination made by a few former employees of the New York Consolidated Railroad, which operates the elevated lines of the Brooklyn Rapid Transit System. President Williams averred that certain men had been discharged for infractions of rules and not for union membership, but that no controversy exists between the elevated company and its employees and that the board is not justified in proceeding with the case.

To the company's proposal that the question of reinstatement of the men be left to the employees' association of the company or to a board of arbitration chosen from employees, Messrs. William H. Taft and Frank P. Walsh, joint chairmen of the board, ruled that a charge of discrimination had been made and that the board could not hand over to any other body its duty of rendering a fair decision. The evidence presented, it was said, would show whether or not the charge was justified.

MAYOR HYLAN INTERVENES

The Department of Labor several weeks ago called upon the War Labor Board to investigate the claim that the Brooklyn company was interfering with the right of its motormen to join the Brotherhood of Locomotive Engineers. Under the principles of the board, workers are protected in their right to join unions and to bargain collectively through chosen representatives with their employers, and employers are forbidden to molest workers in the exercise of the right. To determine whether this principle had been violated, the case was referred to a section of the board consisting of the joint chairmen.

Hearings were held during the last of August before examiners of the board, and a report was made to the chairmen. Subsequently, however, Mayor Hylan of New York City wrote to the board to the effect that there was "immediate danger of a strike because of the discriminatory methods used against the men who are exercising their inalienable right to organize." The board, therefore, reopened the case for another hearing on Sept. 19.

POSITION OF COMPANY

In reply to the allegation that additional discharges for union membership had been made since the hearings before the examiners closed, President Williams outlined his company's position as follows:

The proclamation of the President creating the National War Labor Board defined its "powers, functions and duties" as covering "controversies arising between employers and workers in fields of production necessary for the effective conduct of the war."

No controversy existed in this case between employers and workers at the time the War Labor Board instituted an inquiry, and no such controversy now exists. There would have been no interruption of service had the War Labor Board not intervened, and there is no indication of such interruption now as justifies the Mayor in calling upon the War Labor Board to re-open this case.

The only threat of a strike came from men outside our employees and representatives of a labor organization that had for years been unsuccessfully trying to represent our men in their relations to the company. This outside talk of a strike was pure bluff, founded upon the expectations that it would bring to the assistance of a losing cause the influence of the national government. All but four out of the 450 employees affected have signed a statement that—"There is no controversy between our employer and ourselves upon the questions of wages, working conditions, hours of labor, discrimination, intimidation or otherwise."

NOT IN INTEREST OF INDUSTRIAL PEACE

The situation presented therefore is that the functions of the National War Labor Board have been appealed to—without the knowledge of the National War Labor Board, I presume—not, as defined by President Wilson, to settle a labor controversy but to incite one; not in the interest of industrial peace but in the interest of industrial discord.

Such an injection of discord where harmony now prevails would seem to be incredible. It is difficult enough for electric railways in times like these to discharge properly their duties to the public without exposing the public and the war activities of the government to the added injuries which would follow a serious interruption of transportation service.

The principles to be observed by the National War Board, as defined at its creation, specifically stated:

"In establishments where union and non-union men and women now work together, and the employer meets only with employees or representatives engaged in said establishments, the continuance of such condition shall not be deemed a grievance."

NO STRIKE IN NINETEEN YEARS

That is our situation. For about a score of years our employees have had an association of their own, designed originally for purposes of insurance against death and illness and for social welfare. About two years ago the functions of this association, in order to procure greater co-operation between employer and employees, were extended by the selection of departmental trustees for the adjustment of working conditions.

Owing to the sympathetic and co-operative relations between company and employees, there has been no labor strike upon our system for nineteen years, our system standing alone among New York transportation companies in this record. Among our elevated and subway employees there has never been a strike since these railroads became a part of our system.

The particular matter which the board has been called upon to consider is not one involving wages or hours of labor, but whether certain employees who have been dismissed from the service of the New York Consolidated Railroad shall be reinstated, and whether motormen of that company shall be given the right to join and take an active part in the organization of the Brotherhood of Locomotive Engineers "without fear of intimidation or dismissal from the service," as well as the right to bargain collectively.

GOOD REASONS FOR DISCHARGES

The evidence taken by the examiners of the board indicate that no men have been discharged except for good and sufficient reasons. As to the question of "intimidation," there is just as much proof or more of intimidation of our employees by these outside labor organizers as there is of intimidation by the company against its employees.

The company does not, however, look with favor on any attempt to substitute for the existing association representing all of its employees an organization controlled essentially by men who are not in its employ. It does not hesitate to inform its employees of this conviction, or to persuade them that their interests do not lie in that direction.

Such an organization, dominated by outside influences and prejudices, too often establishes a barrier between employer and employee. It makes for discord instead of harmony. It destroys co-operation and sympathetic relation. It brings outside troubles into local affairs. It substitutes the judgment of uninformed and often selfish outsiders for the judgment of experienced and well-informed insiders.

WOULD CALL IN TRUSTEES

The first purpose of the War Labor Board was that the employers and employees of private industries should not attempt to take advantage of the existing abnormal conditions to change the standards which they were unable to change under normal conditions. Our employees have not attempted to take advantage of any such abnormal conditions to change existing standards, but outside agents, who vainly for two years have attempted to change the principles upon which our industrial relationship was founded, are now attempting again with the hope of support from the War Labor Board to inject discord into a peaceful situation.

In behalf of this industrial relationship, in behalf of the principles which underlie it, in behalf of a continuance of peace, in behalf of the people whom we serve, and in behalf even of the government itself, whose war operations will be seriously embarrassed by any labor disturbance, we ask you to think twice before you will lend your influence and support to those who would disturb and destroy the principles and results which long years of co-operation have established. We ask you to announce, and to announce promptly, that there is no situation presented here which calls for the exercise of your powers of recommendation.

If in your judgment the evidence taken by the examiners indicates the possibility of any injustice done to employees who have been discharged, we suggest that the facts in each case be presented to the departmental trustees, whom the employees have themselves selected to represent them, and we pledge ourselves to observe the recommendations of such trustees as to the reinstatement of these recently discharged employees.

The remainder of the hearing was devoted mostly to testimony of former employees and company officials. The motormen asserted that they had been discharged on account of excessive demerits which had rapidly accumulated after they joined the union. Company representatives, however, showed that the men had received demerits before and that the immediate cause of discharge was serious infractions of the rules, such as running at excessive speed around elevated curves. It was averred that the union members had in no way been subjected to discrimination. The complete records of all men called up for demerits and warning or discharge in the last three months were promised to the board. The hearing was then adjourned, and a decision was promised at the earliest possible date.

GENERAL NEW YORK HEARING ASKED FOR

In connection with the opening of the Brooklyn hearing, James H. Vahey, counsel Amalgamated Association of Street and Electric Railway Employees of America, asked that the War Labor Board hear alleged complaints on the part of employees of the New York Railways and the Third Avenue Railway. Mr. Taft remarked that the board had received a request for Charles B. Hubbell, chairman Public Service Commission for the First District of New York, to assist the commission in handling the New York transportation situation. He added, however, that the board would have to consider the question of jurisdiction, and definite complaints must be filed so that the issues might be clear.

Four Tramway Topics Absorbing to Britishers

Tramways & Light Railways Association Holds Conference on Labor, Industrial Councils, Fuel and Higher Fares

THE annual meeting of the Tramways & Light Railways Association of Great Britain, which was helc in London in July, took the form of a conference Informal discussion on topics of pressing importance to the industry were the features. It appears tha the problems agitating the tramway managers of the British Isles are substantially the same as those in the foreground in this country, although the details diffe materially.

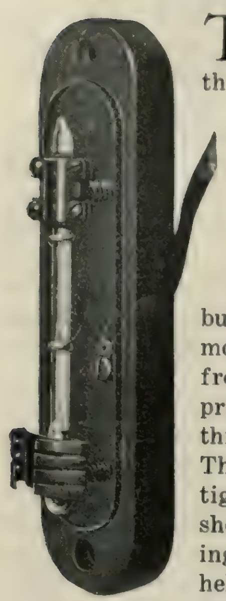
In the matter of national awards of tramwaymen's wages it appeared from the discussion that the tramways had been embarrassed by their lack of right t organize so as to deal as a unit with the Nationa Transport Workers' Federation. It became necessar to appoint a representative committee to present th tramways' side of the controversy to the National Committee on Production. The result was first an award o an all-round war bonus of 20 shillings per week. Late after the men had presented claims for an increase c 12½ per cent in the basic rate, the bonus was raise to 25s. In this same connection the discussion indicate that progress is being made with plans for nationa councils of labor and the industries, including the corporate and municipal tramways, for the purpose c reaching agreement on fundamental economic relation

The speakers at the meeting expressed concern ove the coal restriction order of the government sent ou by the tramways committee of the Board of Trad reducing the coal allowance of tramways in souther England by 15 per cent. From the technical standpoi interest centered in the possibility of supplementi the coal supply with coke or coke breeze. It was point out that a 15-per cent reduction in fuel means mo than this reduction in service on account of the nece sary standby losses in the power plant.

The discussion on increased fares is now of litt interest because it was preliminary to the House Commons bill abstracted in the issue of this paper f Sept. 7, page 418. It seems that the members hop for a better allowance for the owners of the tramw properties than was actually allowed in the bill, though the bill itself was the outcome of the work this association and the Municipal Tramways Associ tion. Five per cent on stock was an allowance favore but the bill provided maximum dividends not to exce three-fourths of the pre-war rates.

During the past year more than 7,000,000 copies the weekly bulletins have been printed and distribut by the National Safety Council, 750 original bulleti having been prepared. Forty-seven local councils a now actively pushing safety work. Eight "Safe Pra tices" pamphlets have been printed and distribute three others are in press and twelve more are in prepa ation. The national headquarters staff at Chica now comprises thirty-one persons. In the words W. H. Cameron, general manager of the Council, "Safe work in the United States has arrived."

New Form of Thermostatic Heat Regulator for Cars



THE accompanying halftone shows a new form of thermostat made by the Railway Utility Company, Chicago, Ill. The makers guarantee a regulation of temperature within 1 deg. by its use as compared with 4-deg. range which was secured with the type previously made by the company.

It consists, as shown, of a mercury bulb and tube securely but flexibly mounted so that the action will be free from the effects of vibration. Extra protection is afforded the bulb itself through the guard which incloses it. The thermostat is mounted in an airtight case, the cover of which (not shown) engages with the ridge projecting from the back casting. The cover is held in place by two screws passing through the holes shown in the back.

As will be evident from this description the mounting has been so designed as to render the thermostat as nearly "foolproof" and "tamperproof" as possible.

Making Temperature Trip the Circuit Breaker

THE fact that most electrical apparatus can withstand momentary overloads without danger has gradually led operators to push up the current values at which electromagnetic protective devices will operate, or to dispense with them entirely, rather than undergo the inconvenience of having them disconnect the machinery on momentary peaks.

A method of visual protection on the basis of temperature has been in use for some time. Exploring coils are built into the apparatus and used to indicate the temperature of hot spots by electrical means.

The Westinghouse Electric & Manufacturing Company has now brought out the type CT relay, which automatically trips the circuit breaker when the temperature reaches the danger point under excessive current. This device may be used to protect any alternating-current apparatus from excessive heating if the apparatus is so arranged that exploring coils can be installed.

The type CT temperature relay operates on the Wheatstone bridge principle. Two arms of the bridge are copper exploring coils arranged to be placed in the oil or embedded in the windings of the apparatus to be protected, the other two arms are unchanging resistance mounted in the relay. The current for the bridge is supplied by the current transformer connected in the circuit of the apparatus to be protected. The relay has two windings which co-operate to produce torque in a manner similar to the current and voltage coils of a wattmeter. The main winding is a coil operated directly by the current transformer. The auxiliary coils are connected to the Wheatstone bridge arms similarly to a galvanometer connection, and thus receive current the magnitude and direction of which depends upon the resistance of the search coils. Above a certain temperature the torque of the relay is in the contact direction and below it, in the opposite direction. To close the contact, two predetermined conditions must co-exist: excess current and excess temperature.

Keeping an Accurate Record of Energy Consumption at San Diego

ONE of the greatest sources of energy waste on many electric railways is failure to meter or otherwise keep account of the energy used by different departments as in carhouse lighting, shop tool work, track welding, etc. This charge cannot be brought against the San Diego Electric Railway, which has realized for years past that lack of accounting means indifference and carelessness. This company does not allow the feeling to exist that the power station is the "easy mark" of the system. The care given by the company to what has now become more important than ever is indicated by the following sample monthly report prepared by Homer MacNutt, superintendent of motive power:

WHERE AND HOW POWER WAS USED

		Kilowatt-hours
37 E	San Diego Electric Railway Machine shop, Sixteenth and L Streets	2,430
37 E	Pit wheel grinder, M Street carhouse	1,240
38	Shifting cars between M Street carhouse and machine shop	120
39	Shifting cars between Adams Avenue carhouse and machine shop	526
39	Shifting cars for pit wheel grinder	30
71 D	Shifting cars, track to track at M Street and Adams Avenue houses	434
71 B	M Street carhouse, outside lights	180
71 B	Adams Avenue carhouse, outside lights	180
23 E	Automatic sectionalizing switches	2,265
67 H	Electric track switches	155
72	Signal lights, First and Spruce, Fifth and K Stretes, Fifth and University Avenue	110
78 D	Lights at ends of lines:	
	Fortieth and M Streets	100
	S. D. & S. E. Railway Bridge, Thirty-third and M Streets	60
	Exposition terminal loop	60
	Mission Cliff Gardens, toilet and waiting room	120
	Kensington Park, Adams Avenue line	60
	Fort Stockton Drive and Trias Street	60
	Old Town line at Ramona's Home	60
	Park Boulevard and Adams Avenue	60
	Ferry wharf, San Diego side	9
	Ferry wharf, Coronado side	0
81 A	Mission Cliff Gardens, Pavilion house	0
	S. D. & Coronado Ferry Company, S. D. side, lights and heater in building	72
	S. D. & Coronado Ferry Company, oil pump at Coronado	16
	S. D. & Coronado Ferry Company, machine shop at Coronado wharf	0
	Hotel del Coronado, sewer pump	233
	Christ Episcopal Church, Coronado	10
	S. D. & South Eastern Railway shops	3,530
	California China Products Company, National City	0
	Construction cars (in a separate report)	
	Bonding cars (in a separate report)	
78 A	Wrecker car No. 12 charged at 3 kw.-hr. per mile when in use	0
78 A	Tent City sewer pump, holes 2 and 3	347
	Thirtieth and Woolman	60
	Roseville	60
	Ocean Beach	60
	Lights in machine shop	60
	Armature oven	357
	Total	13,244

"Economy" watt-hour meters have recently been installed to check the energy consumption.

The American Institute of Electrical Engineers has published an article by Frank T. Baum, consulting engineer, San Francisco, Cal., on a simple method for determining the economic proportion which should exist between hydroelectric and steam power in a plant utilizing both. Mr. Baum gives in non-mathematical form the principle underlying his plan and illustrates its application by means of curves and numerical calculations. The article appears in the September issue of the A. I. E. E. Proceedings.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Philadelphia in Review

Conditions Are Such That Company Can Continue for Present Without Fare Increase

T. E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has written to the Public Service Commission, setting forth in detail the amazing growth in stability and prosperity of the company under the Stotesbury management and giving the assurance that the timely assistance of the government, in supplying funds for needed equipment, and the abnormal increase in earnings are serving to meet the immediate wants of the company.

FUTURE UNCERTAIN

The communication, however, gives what amounts to a notice that while the improved financial condition of the company will not necessitate an increased fare before Jan. 1, 1919, some form of relief will have to be applied whether the pending operating lease with the city shall be approved or rejected by the commission. For under the lease an increase is automatically assured when the need shall arise; without it, the company announces that it will be prepared to submit a program for some sort of a zone system, by which long-distance riders will have to pay more than the "base fare of 5 cents."

In his letter Mr. Mittten said:

"The company's position has been greatly improved, although its every step in the later years of this management has been made difficult by the uncertainty of the city's plans and the consequent impossibility of establishing a definite program for the future. Under such a handicap this management has increased its facilities so that it carried, in greater comfort than heretofore, 741,140,856 passengers during the year ended June 30, 1918, at an average fare of 3.96 cents per passenger, as against a total of 432,884,253 passengers during the year ended June 30, 1910, at an average fare of 4.15 cents per passenger."

RESERVE FUNDS TO BE USED

Under the Stotesbury management, the net increase in the capital obligations of the company has been $12,854,792 and fixed charges increased about 13 per cent, yet the proportion of gross earnings required to pay fixed charges, which was 46 per cent in 1910, was only 32 per cent for the latest fiscal year. Earnings provided $4,103,639 of the cost of new cars.

The renewal reserve, which at the outset of the Stotesbury management "consisted of securities having an estimated value of $1,200,000," and has since received 15 per cent of gross earnings to insure upkeep of the property "now contains a balance of $2,625,000, of which $1,434,391 is in cash." Mr. Mitten then adds, "We shall dip very deep into this reserve during the next few months, while putting our cars and tracks into condition, but it must be understood that we have accumulated this money for just such an emergency."

During the eight-year period ended June 30 last the aggregate gross revenue of the company and its disposition is given as follows:

Interest and rentals..........	$74,895,127
Wages to employees..........	69,502,064
Materials and expenses of operation, maintenance and renewals, claim reserve, etc...	29,588,437
Taxes, including payments to city, State and federal governments	15,272,389
Undistributed surplus	4,884,078
New cars from earnings, renewal account	4,103,639
Philadelphia Rapid Transit, dividends	2,847,933
Gross earnings, distributed as shown	$201,093,667

Seattle Plans Municipal Railway Work

Plans for the development and extension of the Seattle Municipal Railway have been furthered by the passage by the City Council of a resolution introduced by Councilman Oliver T. Erickson, chairman of the city utilities committee, directing the judiciary committee to apply to the capital issues committee for approval of a bond issue of $150,000 "for the extension of the municipal railway on East Marginal Way from West Spokane Street to the south city limits." The resolution also provides for securing approval of $300,000 of utility bonds to buy equipment and build terminals for the road, as well as $500,000 of the $3,700,000 utility bonds authorized by the Council for improvements of the city water system.

Councilman Erickson also recently secured passage of a series of ordinances providing for the equipment for the new elevated railway line. One ordinance provides for the purchase of six single-truck and twenty-five double-truck cars for $217,000; another provides for securing this money from the general fund until a bond issue can be provided. A third resolution provides for the appropriation of $500 to pay the expenses of Superintendent of Utilities Thomas F. Murphine on a trip to St. Paul to inspect cars offered the city by the United Railway & Logging Company.

Middlesex Strike Settled

Chairman of Massachusetts Committee on Public Safety Acts as Mediator

The strike of the employees of the Middlesex & Boston Street Railway, operating through about twenty cities and towns in the suburban district west of Boston, was settled on Sept. 10 by Henry B. Endicott, executive manager of the Massachusetts Committee on Public Safety, after an extended conference with representatives of both sides.

DECISION EFFECTIVE UNTIL JULY, 1919

The "blue-uniform men," to whom the company was willing to grant an increase in minimum wage from 30 to 35 cents an hour and increase the maximum from 40 to 42, receive substantially these advances at the hands of Mr. Endicott. The executive board of the union had agreed to give the offer of the company a trial until Nov. 1, provided the company would agree that after that date either party might refer the case to the War Labor Board, to which the company demurred. It was understood that the decision of Mr. Endicott is to hold until July 1, 1919, at least.

The miscellaneous employees, carhouse men, linemen, trackmen and others, who received from 28 to 42 cents an hour, wanted a minimum of 42 cents, whereas the company was willing to give them 2 cents more an hour than they were getting.

The strike was declared on Aug. 30. It occurred in direct violation of the employees' agreement with the company to arbitrate wage and other disputes by the usual joint selective method, the men insisting that the controversy in this case be settled by the War Labor Board. The company announced its willingness to have this board adjudicate the issues provided questions of working conditions were also included, but the employees were unwilling to submit any matter other than wages to the federal authorities.

SERVICE RESTORED WITH LOYAL EMPLOYEES

The company operated such cars as possible during the strike by utilizing the services of loyal employees, but only a small percentage of the usual car-mileage was run. Plants in the district working on war orders resorted to automobile and motor-truck transportation, supplemented by steam railroad service, to meet the situation created by the strike.

Seattle Sale Plans

Negotiations Apparently Proceeding Satisfactorily for Disposal of Railway to City for About $15,000,000

The offer of the city of Seattle, Wash., to purchase the railway lines and system of the Puget Sound Traction, Light & Power Company for the sum of $15,000,000 was reported in Seattle this week as having been accepted by the Stone & Webster interests in Boston, but at the office of Stone & Webster in Boston it was officially stated on Sept. 18 that no basis for sale had yet been reached.

200 MILES OF RAILWAY INCLUDED

The property under negotiation embraces more than 200 miles of railway, with overhead trolley system, 500 cars, some of them practically new; eight carhouses and a large assortment of general railway equipment.

Any transfer would not involve the power and lighting systems of the company, which would continue business in light and power as well as operate the Everett and Tacoma interurbans, which trackage agreements into the city will be worked out by city and traction officials.

If the deal is arranged the city officials also plan to lease or purchase the city lines of the Seattle & Rainier Valley Railway, giving the city of Seattle complete control, through ownership, of its entire transportation system. Representatives of the Seattle & Rainier line have assured the Council they will accept any reasonable proposition.

An inventory and appraisement of the property to be taken over will be commenced at once by the city.

Official authority for the city to take over the lines will be provided in an ordinance authorizing an extension and improvement of the present municipal railway system. Payment is to be made in twenty-year utility bonds, bearing interest at 5 per cent. The bonds are to be paid out of the earnings of the railway. There will not be a lien on any other city property. It is the purpose of the city officials to try the operation of the lines on a 5-cent fare, and if that is not sufficient, raise the fare to an amount that will bring in the required revenue.

UNIFICATION WILL SAVE $1,000,000

Traction officials assure the city that unification of the railway systems of the city will save at least $1,000,000 yearly in expense. The elevated line which the city is building through the industrial district is expected to further reduce the operating expenses. Another means of increasing the income that it is expected will be put into effect is the elimination of jitneys from sections of the city where railway cars can handle the traffic. Jitney competition is said to have been one of the principal causes of reduction in the company's income.

It is expected that the acceptance of the city's offer will greatly clarify the local situation with regard to employees of the company, who have been negotiating for increase in pay. Under a tentative agreement, it is understood that the new arrangement means that effective on Aug. 1 the company was to pay its men on the basis of 50, 55 and 60 cents an hour, and that this scale will be continued by the city after transfer of its lines. Failure of the negotiations for the sale of the lines will mean that the wage question will be submitted to the War Labor Board for adjustment, with possibility of greatly impairing the railway service by reason of the men seeking more remunerative employment elsewhere.

A contract with Stone & Webster, who control both the local railway and the power company, is proposed to be entered into by the city for sufficient power to operate the railway until the city's Skagit River power plant is finished. This station will probably not be ready for three years. The city will pay for the power at the rate of 1 cent a kilowatt, the price at which the city electrical department sells current to the municipal line.

VALUATION BASED ON COMMISSION FIGURES

The price of $15,000,000 for the railway named in the negotiations is based on the State Public Service Commission's valuation of the property and estimate of the City Public Utilities Department, which recently completed an investigation of the properties.

Thomas F. Murphine, Superintendent of Public Utilities, expressed the belief that few, if any, additional new places in his department would be required to handle the affairs of the railway. The City Utilities Department now has a railway operating organization which Mr. Murphine believes could be expanded to meet the new demands. Most of the present 1800 operating officials and employees of the traction company would probably be retained, if they desire to stay with the city.

The purchase of the railway by the city would conclude a long struggle between city and the company over matters of service and franchise obligations. A tremendous amount of litigation has resulted, in most of which the city has been victorious. Some weeks ago, negotiations were undertaken with a view of finding some means whereby better service could be furnished the shipyard workers. The company insisted upon securing an increase in fares. This move was resisted by the city. A counter-offer of the city to lease the railway lines was rejected. A. M. Taylor, in charge of the housing and transportation division of the United States Shipping Board, who has been in Seattle for several weeks, has assisted toward the settlement of the transportation problems now proposed. In discussing the possible acceptance of the offer. A. W. Leonard, president of the company, said:

"We realize that the city, with its legislative power, has many advantages over a private company in the operation of a railway. Seattle would acquire a splendid piece of property, and with the breadth of view shown by the Mayor and the City Council, we feel sure the city would succeed in developing a fine operating system."

Attacks on Chicago Bills

Attempts to block a vote on the new traction ordinance in Chicago were made during the week ended Sept. 14 when two suits were filed seeking to enjoin printing of the question on ballots for the Nov. 5 election. Arguments on both petitions were made in the Circuit Court on Sept. 17. Both petitions assail the right of the City Council to order the traction ordinance to be submitted to the voters. Both also charge the ordinance is illegal because it contains legislation which the Aldermen are powerless to adopt.

Louisville Wage Negotiations Ended

In the matter of the wage dispute between the union of railway employees and the Louisville (Ky.) Railway negotiations have practically ended and as the matter now stands it will be taken before the War Labor Board for adjustment. The company concluded a letter to the union in part as follows:

"We decline to grant you the wages you demand. It is impossible to do so. We decline to enter into any agreement to submit the matter of wages to the War Labor Board. If and when you shall demand of the War Labor Board to take up the question of differences between you and this company, and we are informed of that fact by the War Labor Board, and are invited to join you in submitting to the War Labor Board the matters in controversy, we will then make a reply to the War Labor Board, but in any event, we shall insist that if there is to be an appeal to the War Labor Board, all questions are to be considered as open between us and that we are not to be bound to enter into any contract with you except such as may be required to be entered into by the War Labor Board."

Independent of any arbitration as to permanent increase in wages, the railway made the following announcement to its employees:

"Negotiations between the employees and the company were broken off yesterday afternoon. In considering the matter the company has concluded that it is just as a war-time measure to advance the wages of conductors and motormen 7 cents an hour and other employees paid by the hour in the same proportion based on their wages July 1, 1918. This advance is to take effect Sept. 1, 1918."

Turning the Tables

Kansas City Smiling at the "Star," Which Knocked Fare Increase but Increased Its Own Price

The Kansas City public has got a good deal of amusement—and satisfaction—out of the efforts of the Kansas City (Mo.) Railways to tell its side of the story of increased fares, in answer to the Kansas City *Star's* criticisms of the railway and others concerned in bringing about such increase.

Company's Paper States Facts

Every week the railway has presented the subject of higher fares in its bulletin circulated on the cars, making response, with facts, to the attacks of the newspaper. As different cities went to higher fares, and as evidence accumulated of the necessity for public service corporations and public service departments of municipalities, charging more for the service, the bulletin marshaled an increasing array of testimony for the advance in Kansas City.

IN VIEW of ENORMOUSLY INCREASED COST of PRODUCTION ETC. ETC. ETC WE ARE COMPELLED TO CHARGE 50% MORE FOR OUR PAPER
NO YOU DONT!! YOU FELLOWS WONT GET ANY MORE IF I CAN PREVENT IT
K.C. STAR
PUBLIC UTILITIES AND ALL OTHER ENTERPRIZES

THE STAR AS OTHERS SEE IT
(*From The Railwayan*)

The climax of the company's display of evidence backing up a fare increase came in September. The *Star* announced on Sept. 1 that its price of 10 cents a week for morning, evening and Sunday papers by carrier would be advanced to 15 cents, and that its street sale price would be raised from 1 cent to 2 cents. The announcement mentioned the advances in the cost of production, and referred to correspondence with the War Industries Board, which board had called the attention of the *Star* to complaints from competitors of the low price of the paper.

From the point of view of the railway, the situation was particularly opportune, because of a phrase the *Star* had used editorially:

"Who's Next?"

"Street railway, electric light company, gas company—who's next?"

It was apparent that the *Star* itself was the next agency furnishing a public service (of a sort) to advance its price.

The railway displayed on the front of its cars for a week the following placard:

"Owing to War Conditions the *Star* Reluctantly Increases Its Price and Still Knocks the 6-Cent Fare."

The paper answered this placard, with an editorial saying that it "is not knocking 6-cent fare if 6-cent fare is just." The railway company thereupon changed its placards, which then read: "Even the *Star* is for the 6-cent fare now."

Other placards called attention to *The Railwayan*, the weekly bulletin that would be on the cars on Sept. 9, in which the whole matter would be discussed. This bulletin contained direct and forceful statements—the first edition of 30,000 was exhausted by noon, and a second edition of 20,000 was exhausted on Tuesday.

Cleveland Terminal Hearing

A public hearing was held on Sept. 11, on the plan to erect a union passenger station on the Public Square at Cleveland, Ohio. Attorney J. L. Cannon, representing the Cleveland Union Terminals Company, indicated that full information was wanted before any important steps were taken. Objection was made to the removal of the proposed depot from the group plan or mall, of which the new courthouse and city hall form a part. The change proposed would necessitate an important revision of the plans. Instead of a handsome structure, a freight yard would face the buildings which have already been erected.

Mr. Cannon said the sponsors of the plan want to get an expression of public opinion. If a union depot on the Public Square is not wanted, it will be an easy matter for the voters so to decide. He could not say whether all the railroads would agree to use a station in that location, but if they did not, there would be no depot. This probably means the interurban electric railways as well, for these roads are to be provided for in the terminal plans.

As soon as the plans of the new company were announced, several members of Council thought it would be a good plan to insist upon the electrification of all steam roads entering the city. Mr. Cannon informed them that such a requirement would kill the project at once. The plan of the projectors is to provide for terminal facilities as soon as possible and then erect as much of the depot building as the government will approve. They do not believe that the entire plan can be carried out until conditions change, because government approval of any plans so extensive as those under consideration could not be secured.

In connection with his visit to Cleveland for the inspection of railroads and their facilities, W. G. McAdoo, director general of railroads, inquired into the project for building a new union station on the Public Square.

Conductresses for Detroit

Detroit United Railway Short More Than 300 Men, Will Put Women On the Cars

The Detroit (Mich.) United Railway announced on Sept. 12 that it had found it necessary to employ women as conductors and that it would begin to receive applications for these positions on Sept. 13. The women will be assigned to the Woodward Avenue line first and gradually other lines will get their share of them. It is likely that between 200 and 300 will be employed.

The women will be paid the same scale of wages as the men, as follows: first three months, 43 cents an hour; next nine months, 46 cents an hour; after one year, 48 cents an hour. The company has set no age limits, merely prescribing that applicants must be of good health; have good hearing and eyesight, and must be of good moral character. For the present they may wear such clothes as they choose, but a cap, bearing a number, will be furnished by the company. Later the women will wear uniform coats.

The company is inviting wives and daughters of former employees now in military service to apply for the positions. Such applicants will be given the preference.

For several weeks past the company has been short from 300 to 350 men. In an announcement the company said:

"We are firm in the belief that these women conductors — patriotically offering their services to replace men who are now on the battlefields of France or who will soon be—will receive the hearty co-operation of the general public and will speedily prove their worth."

Successful women applicants will receive three or four days' preliminary training before they are put on cars.

Ohio Interurbans to Aid

Samuel Lake, connected with the Federal Railroad Department, has been in Ohio for several days, inspecting interurban railways with a view to making recommendations for an increase in their carrying facilities wherever necessary in order to furnish the desired aid to steam roads. He and J. B. Dugan, representing the Ohio Public Utilities Commission, spent several days in and around Toledo and also visited other points in Northwestern Ohio.

Toledo, being an important interurban center, may be selected as the location for a large freight station. If it is found necessary to have such a building, one may be leased or built. The Toledo Terminal Railroad already has a building which would serve well for this purpose, should the location be suitable. To just what extent the interurban railways will be able to furnish aid will depend upon the increase in equipment that can be secured, after the present facilities have been developed up to the limit.

News Notes

Wage Increase in Dallas.—Effective from Sept. 1 the Dallas (Tex.) Railways granted a war bonus of 4 cents an hour to its conductors and motormen. The bonus will remain in effect during the war. This is the second increase this year.

Offices in New Location.—The offices of the Columbus Railway, Power & Light Company, Columbus, Ohio, so long located at 14 North High Street, have been moved to 104 North Third Street, where more space and better facilities have been secured.

Priority for Subway Construction.—The Public Service Commission for the First District of New York has secured from the War Industries Board at Washington priority certificates sufficient to insure the completion of essential parts of the dual subway system.

Trenton Company Removes Office.—The general office of the Trenton & Mercer County Traction Corporation have been removed from the American Mechanic Building, Trenton, N. J., to the Broad Street Bank Building, where the entire seventh floor is occupied.

Free Rides to Soldiers and Sailors.—William L. Smith, general manager of the Dayton (Ohio) Street Railway, has announced that hereafter soldiers and sailors may ride free on the line. The company is having 1,000,000 transfers printed containing Liberty Loan advertisements.

Mr. Witt on Municipal Ownership.—Peter Witt on Aug. 26 addressed the Public Ownership League at Trenton, N. J., in which he advocated the public ownership of electric railways and other utilities. Director of Public Safety George B. LaBarre, Trenton, N. J., spoke along similar lines.

Montgomery Strike Settled.—An agreement has been entered into between the Montgomery Light & Traction Company, Montgomery, Ala., and its trainmen under which the strike in that city has been settled. The company has conceded the right of the men to organize. Service has again returned to normal..

Offers Inducements for Patriotic Saving.—The Toledo Railways & Light Company, Toledo, Ohio, has offered the married employee who shows the largest savings for the year invested in thrift stamps a present of a $100 Liberty Bond. The unmarried man who makes a similar showing will receive a $50 bond.

Increase in Wages in Fort Worth.—The Northern Texas Traction Company, Fort Worth, Tex., increased the pay of its employees effective on Sept. 1, 5½ cents an hour. Under the new schedule, beginners will receive 38 cents an hour. Since the United States entered the war, the aggregate increases in wages amount to 60 per cent of the former wage and the increases since the beginning of the war in Europe amount to 75 per cent.

Interurban Increases Wages.—Commencing on Sept. 12 and thereafter for the duration of the war or until further notice, the wages of motormen and conductors of the Washington-Virginia Railway, Washington, D. C., will be as follows: First three months, 43 cents an hour; next nine months, 46 cents; thereafter, 48 cents. Extra men will receive one-half pay from time of reporting for work until excused for the day or assigned to a run.

Women for Johnstown.—Unable to secure sufficient men to operate its cars, the Johnstown (Pa.) Traction Company is planning to employ women as conductors. E. M. du Pont, general manager, says that although the trainmen have been granted a wage increase of 12 cents an hour, the company has not been able to get motormen and conductors. The new wage of 45 cents an hour increases the company's payrolls about $7,000 a month.

Texas Electric Increases Wages.—The Texas Electric Company, which operates the interurban lines from Dallas to Denison and Sherman, from Dallas to Waco and from Dallas to Corsicana, and the local lines in Sherman, Denison, Waxahachie, Corsicana and Waco, announced an advance in pay of motormen and conductors effective from Sept. 1. The raise amounts to 4 cents an hour. It is granted as a war bonus because of the increased cost of living.

Kansas City Labor Agreement Renewed.—The Kansas City (Mo.) Railways has renewed its agreement with its trainmen and other employees, all features being covered except that of wages. The agreement as signed expressly provides that the wage question shall wait the action of the War Labor Board, which will take up the Kansas City Railways' problem during September. The agreement is practically the same as that made a year ago, except for a few changes in language.

Gasoline Replaces Steam.—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway, San Diego, Cal., to cease operating its steam trains between San Diego and La Jolla, and to make three round trips a day by gasoline motorcars. The commission found that the increased costs of operation, and the increasing use of privately owned automobiles and the competition furnished by a stage line now operating between these points, did not justify the continuation of the steam line.

Cleveland Subway Report in Six Months.—It is believed that Barclay Parsons & Klapp, New York, engineers, in about six months will be able to complete a survey of the city of Cleveland for the purpose of constructing a subway or rapid transit system. A study of the growth in population will come first, after which the occupational location of the people will be considered. After this a study of the building activities for several years back will be made and this will be followed by an investigation of the traffic situation with special reference to relief from congestion.

English Tramways Will Need Rebuilding.—Quoting a Boston business man who has just returned from a stay of several months in England and France the Boston *News Bureau* says: "Business in the tight little isle is humming as never before. An indication of the expansion already accomplished is afforded in the figures of steel capacity, which has increased from 4,000,000 tons annually before the war to 12,000,000 tons now. A large steel manufacturer expressed the opinion that the steel business of the country will be tremendous for years after the war. For four years there has been nothing but the most necessary repair work. The railways and tramways will have to be practically rebuilt."

Wages and Fares Coupled.—It is the purpose of the Virginia Railway & Power Company, Richmond, Va., to make applications promptly to the municipal governments in Richmond, Petersburg, Norfolk and Portsmouth for a 6-cent fare. As soon as this relief is assured and additional revenue provided, the company will advance the scale of wages of its motormen and conductors throughout the system to a minimum of 41 cents an hour and a maximum of 45 cents an hour and other employees in proportion, which increases will remain in force so long as the additional revenue provided by the increased fare is effective. The matter of a straight 5-cent fare for the company in Richmond has been before the Council there for some time.

Labor Differences Adjusted.—The differences between the motormen and conductors in the employ of the Atlantic City & Shore Railroad, Atlantic City, N. J., and the officers of the company, have been settled by the granting of an increase of 5 cents an hour to the platform men, and the recognition of the union by Receiver Clarence L. Cole. The increase became effective on Sept. 1. The crews running between Atlantic City and Longport and the Inlet will now receive 36, 38 and 40 cents an hour, and the men on the Ocean City division, 38, 40 and 45 cents an hour. Overtime will be paid for at the rate of time and a half. The pay is for a day of ten hours, which must be completed within twelve hours. There will also be a revision of swing runs.

Financial and Corporate

Great Expectations

Utah Company Shows How Commission Erred on Increased Fares—Lose 464,161 Riders in Month

That estimates of results expected with increased fares, particularly in small or medium-sized cities, frequently do not even approximate the results actually obtained is strikingly illustrated in the case of the Utah Light & Traction Company, Salt Lake City. In *Kar-Fax* for Sept. 14, published by the company, appears the following comment:

SOME OF THE ESTIMATES

"Last fall, and again this summer, the Public Utilities Commission took measures to save the Utah Light & Traction Company from bankruptcy by authorizing a raise in rates. By its first action the commission estimated that the company's revenue would be increased about $10,000 a month, and by the second—the adoption of the 6-cent fare and the 5-cent commutation ticket—the commission estimated a further increase of $11,000 a month, making a total of $21,000.

"But, like the divisional chief, they didn't figure on the pile of sand. They based their calculations on what they had good reason to believe was a solid "take-off" for the company's running jump to safety, or in other words the volume of business of the company during 1917. But, as a matter of fact—almost overnight, so to speak—it has proved a pile of sand.

"Instead of increasing, as might have been expected, or at least remaining stationary, the passenger traffic is decreasing to an alarming extent. We have already given the figures showing this for the period of April through July. Figures for August prove that the loss in patronage is getting even greater.

SOME OF THE RESULTS

"The total decrease for last month, as compared with August, 1917, was 464,161 passengers. This is a greater loss by 131,670 over that of July, the decrease during that month, as compared with July, 1917, being 332,491 passengers.

"The result is that, in spite of the advance in fares granted on two occasions by the Public Utilities Commission, the Utah Light & Traction Company is worse off than it was a year ago. Instead of an added revenue of $21,000 for the month of August, 1918, as compared with the same month in 1917, it has suffered an actual loss of $4,055.

"It is true that this loss tapered off somewhat the latter part of the month, and the showing may be better for September. But the prospect is anything but cheerful. Even though the 6-cent fare comes up to the most sanguine expectations of the commission in point of ratio to the 5-cent commutation rate, it is difficult to see how, with men—street car passengers—continually being called in the draft, and with no adequate compensation in traffic, the Utah Light & Traction Company can maintain its present service on its present revenue."

Abandonment Threatened

The city of St. Thomas, Ont., has entered an action in court to recover $8,000 from the London & Lake Erie Railway & Transportation Company, claiming that amount as rental for the use of streets and of the tracks of the municipal railway. The company responds with claims for work done and materials provided, which the defendants assert will nearly offset the bill. The London & Lake Erie company has repeatedly indicated its intention to abandon operation and scrap the road which runs between London and Port Stanley. An official of the railway was quoted by a Toronto newspaper recently as saying that it is only a matter of a few days until this course will be taken. The railway has lost money since the city of London electrified its paralleling steam road. St. Thomas took its bill to court only after the company had failed to send a representative to discuss the situation with the City Council.

Commonwealth Splits Even

Rise in Expenses Balances Revenue Gains—Interurban Passenger Earnings Increase 22 Per Cent

The gross earnings of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., for the twelve months ended Dec. 31, 1917, amounted to $3,041,130, a substantial decrease from the figure of $3,458,729 in 1916. Deductions for expenses and interest increased from $806,986 to $891,505, so that the net income available for dividends, replacements and depreciation dropped from $2,651,742 in 1916 to $2,149,624 in 1917. Preferred stock dividends of $1,077,010 were paid in the last year, comparing with $1,019,170 in 1916, and the balances in the two years were $1,072,614 and $1,632,572.

The combined results of operations for all the subsidiaries in the last two calendar years are shown in Table I. The cost of labor increased $571,313 or 24 per cent, the cost of coal and oil $1,610,050 or 84 per cent, and taxes $304,955 or 33 per cent. The receipts and expenses both increased about $2,700,000, but owing to the rise in fixed charges the net income available for dividends, replacements and depreciation showed a falling off of $502,117 or 18.9 per cent.

TABLE I—COMPARATIVE INCOME STATEMENT FOR SUBSIDIARIES OF COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY IN CALENDAR YEARS 1916 AND 1917

	1917	1916	Increase	Per Cent Increase
Gross receipts	$19,723,736	$16,962,606	$2,761,129	16.28
Operating expenses	11,078,632	8,374,620	2,704,011	32.29
Gross income	$8,645,104	$8,587,986	$57,118	0.67
Fixed charges, including taxes and dividends on outstanding preferred stocks of subsidiary companies	6,495,479	5,936,244	559,235	9.42
Net income, available for dividends, replacements and depreciation	$2,149,625	$2,651,742	*$502,117	*18.94
Dividends on preferred stock	1,077,010	1,019,170	57,840	5.68
Balance	$1,072,615	$1,632,572	*$559,957	*34.30

*Decrease.

The proportionate shares of the various classes of subsidiaries in making up the gross receipts are shown in Table II. While the city lines showed a slight decrease, the interurban passenger receipts increased 22.32 per cent. The city traffic in revenue passengers fell off 635,859 or 6.87 per cent, but the interurban traffic gained 1,798,157 or 17.37 per cent. Part of the interurban increase was due to the extension of lines to the cantonments at Rockford, Ill., and Battle Creek, Mich.

TABLE II—DIVISION OF GROSS RECEIPTS FOR SUBSIDIARIES OF COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY IN 1916 AND 1917

Gross receipts	1917	Per Cent of Total	1916	Per Cent of Total	Increase	Per Cent Increase
Gas	$2,504,996	12.70	$2,125,925	12.53	$379,070	17.83
Gas residuals and miscellaneous	1,186,568	6.02	739,856	4.36	446,711	60.38
Electric†	7,594,242	38.50	6,297,088	37.12	1,297,153	20.60
Heating and water	535,928	2.72	465,168	2.74	70,760	15.21
Railway:						
City	4,243,042	21.51	4,275,014	25.20	*31,972	*0.75
Interurban	2,838,033	14.39	2,329,099	13.68	517,934	22.32
Freight and miscellaneous	820,924	4.16	739,452	4.37	81,471	11.02
Total	$19,723,736	100.00	$16,962,606	100.00	$2,761,129	16.28

†Electric sales to subsidiary railways are eliminated.
*Decrease.

Parent Company Responsible to Public

Court Holds Receivers Should Pay Fixed Charges of Underlying Company Only from Surplus Funds

The receivers for the Pittsburgh Railways have been authorized by Judge Charles P. Orr in the United States District Court to pay $247,075 fixed charges due its chief underlying company, the Consolidated Traction Company, for August, and $31,465 for similar charges for the month of September. No mention is made, however, of $216,582 in fixed charges due in August to other underlying companies.

CITY AND ONE RECEIVER PROTEST

The payments had been protested by the City of Pittsburgh, near-by boroughs and one of the three receivers for the company. They maintained that the money should be expended for needed improvements.

The matter of the payment of the fixed charges came before the court in the form of a petition for advice on what to do regarding payment. In a supplemental petition Receiver Fagan protested against the payment. This brought forth a petition from the Consolidated Traction Company, backed up by the majority receivers, that the fixed charges due the company be ordered paid. The court upheld the right of the Consolidated Traction to intervene because of its claim to ownership of a considerable part of the property embraced in the Pittsburgh Railways system. The court said in part:

"The legal position of the Consolidated Traction Company is that the receivers of the Pittsburgh Railways cannot retain the property of the Consolidated Traction Company in their possession and also keep the income derived by the receivers from the operation of such property. The discussion of this legal position at any length is unnecessary.

"Before receivers are required to elect whether or not they will affirm a lease entered into by an insolvent corporation prior to their appointment, they are entitled to a reasonable time to determine whether the assumption of the obligations of the lease would be beneficial to the trust. What is a reasonable time within which receivers may declare such election varies in almost every case. The present case is one necessarily involving great perplexities.

SOME UNDERLYING COMPANIES DESERVING

"These underlying companies want some share of these returns as compensation for the use of their properties. Some produce a substantial net income while some do not. At the present time all properties comprising this system operated by the Pittsburgh Railways are being valued. Until such valuations are obtained, it will be difficult even to take the first step toward a solution of any of the perplexing problems which confront the parties interested. There should be no election therefore by the receivers to affirm or disaffirm any of the contracts entered into by the Pittsburgh Railways with subsidiary corporations until after the valuations of the various properties comprising the system have been completed. Therefore, the Consolidated Traction Company is not entitled at present to the return of its properties.

"Nor is the petitioner entitled, as a matter of right, to the alternative of the prayer. In other words, it is not entitled to have payment of the sums named in the lease because its property is retained by the receivers. If it be entitled to any moneys at all, because of its interest, it will be entitled to them solely because the receivers have more money in their hands than they will be able to spend within a reasonable time, in placing the various properties under their control in condition properly to perform the duties owing to the public. At the time of the hearing the court expressed the view that the interests of the public were paramount to all others.

DUTIES TO PUBLIC PARAMOUNT

"The principle is well recognized that before moneys shall be applicable to the payment of interest to bondholders or dividends to stockholders, the duties toward the public should be performed. Therefore, in the present case it is the duty of the receivers to discharge the obligations of the Pittsburgh Railways to the public before discharging the obligations to investors.

"The receivers have in their hands now more money than they can spend at the present time or in the near future, and the moneys in their hands are increasing greatly. To withhold all of said moneys from those who own the properties would be to penalize them for something for which perhaps they are not responsible. If enough and more, that is to say sufficient funds, are retained in the hands of the receivers to meet the expenditures which they can within the near future incur in the performance of their duties as herein outlined, the surplus tributed from time to time in the distributed from time to time in the idscharge of obligations to investors.

"The order for the payment of this money is not to be deemed an order for a continuance of similar payments to the same company as they may mature hereafter. There may be other underlying obligations that may require similar treatment. Such payments as may be made will be made by order of this court and should be separately charged against the particular properties to which they may be applicable, so that upon any reorganization the respective charges and the respective values may have consideration. Let an order be drawn in conformity with this opinion."

Approving immediate compliance with joint demands for better service made by officers of the army and navy and the Public Service Commission, Judge Orr in United States District Court in handing down an order on Sept. 16 on another phase of Pittsburgh Railway receivership, directed the receivers to pay $38,760, mostly for car trust securities, but to defer $72,495 for charges on other underlying bonds.

Loans to Municipal Lines

Under an agreement which was reached recently between A. M. Taylor, director of housing and transportation of the United States Shipping Board, and Mayor Ole Hanson, Seattle, Wash., arrangements were made whereby the city may borrow the sum of $392,000 for municipal railway improvements, of which sum only $330,750 will have to be repaid by the city. Payments are to be made in five annual installments, beginning one year after the close of the war, and bearing interest at the rate of 5 per cent.

The agreement provides tentatively that the city extend its elevated line, now in course of construction, from Spokane Street and Whatcom Avenue west to First Avenue, at an estimated cost of $50,000.

The Fleet Corporation will loan the city $217,000 for the purchase of thirty-one cars, title of the cars to remain with the Shipping Board until the loan is repaid, with 5 per cent interest.

A double-track railway is to be furnished the plant of the Seattle North Pacific Shipbuilding Company. If possible, the city will electrify the Northern Pacific siding and connect it with the Lake Burien line. This improvement will cost $75,000. The Fleet Corporation will advance the money. The city will repay 75 per cent of this amount, and the Shipbuilding Company will repay the city 40 per cent.

The city of Tacoma will obtain a loan from the Emergency Fleet Corporation of $237,000 to double track the tideflats railway and purchase ten additional cars.

Gasless Sunday Helps

The passenger earnings for the Philadelphia (Pa.) Rapid Transit System for Sept. 1 amounted to $75,960 as against an average of $68,845 for the Sundays during the month of August. This increase of $7,115 represents approximately 175,000 additional passengers, which increased riding was due to two factors—first, the discontinuance of automobile operation, and, second, the most favorable weather conditions. Willow Grove Park also reflected the increase. The total receipts from the amusements and concessions there amounted to $20,000, an increase of approximately 15 per cent in the patronage of the park. The automobiles checked at the park decreased to less than fifty from about 800 for a normal Sunday.

Financial News Notes

Road Being Scrapped.—The Adirondack Lakes Traction Company's road at Gloversville, N. Y., set to be sold under auction last June, has been abandoned and is now in the process of being scrapped. The Adirondack Lakes Traction Company, a 5-mile road, was the successor to the Mountain Lake Railroad. Reference to the affairs of the company was made in the ELECTRIC RAILWAY JOURNAL for May 11, page 930.

Would Purchase Columbus Property.—Councilman Fred Zimpfer on Sept. 10 introduced a resolution in Council at Columbus, Ohio, which provides that a request be made to the Capital Issues Committee at Washington to allow the city to issue bonds for the purchase of the railway property of the Columbus Railway, Power & Light Company. This request is to be made on the ground that the company has failed to furnish the public with proper service and that the public interests have suffered as a result.

St. Louis Valuation Planned.—J. L. Harrop, chief engineer of the Public Service Commission of Missouri, has announced that the work of valuing the property of the United Railways, St. Louis, Mo., will be begun by the commission as soon as the valuation of the property of the St. Joseph Railway, Light, Heat & Power Company has been completed. The valuation of the St. Louis property was ordered when the matter of increased fares for the United Railways was before the commission recently.

Offers to Sell to City.—The street railway committee of the Commercial Club of Fort Collins, Col., held a meeting on Sept. 6 at which plans were discussed for the taking over of the property of the Denver & Interurban Railroad in Fort Collins consisting of 7.5 miles of line, or so much as it is desired to purchase, the company having made the city a definite offer. It is understood that the railway has made a definite proposition to sell the local system for $75,000, or any part of the line at the invoiced value.

Income Bond Interest Passed.—Announcement has been made that no interest will be paid on the adjustment mortgage income 5 per cent bonds of the Third Avenue Railway, New York, N. Y., for the six months ended June 13, 1918. The interest is due and payable on Oct. 1, next. Interest was paid regularly from January, 1913, to April 1, 1917. For the six months of 1917 only 1¼ per cent was paid. The interest for the last six months of 1917 was passed. Interest on these bonds is cumulative. There is now due on this issue 6¼ per cent.

Pittsburgh Announces Interest Payments.—J. I. Foster, treasurer for the receivers of the Pittsburgh (Pa.) Railways, announces that coupons due on July 1 and on Aug. 1, from the first mortgage bonds of a number of Pittsburgh Railways subsidiaries will be paid. These include the Bloomfield Street Railway, Washington Electric Street Railway, Duquesne Street Traction Company, Central Traction Company, Pittsburgh-Canonsburg-Washington Railway and Pitcairn-Wilmerding Street Railway. Permission has been granted the Pittsburgh Railways to spend about $375,000 on pressing repairs.

Renewal of Notes Denied.—The California Railroad Commission has denied the application of the Los Angeles & San Diego Beach Railway, Los Angeles, Cal., to issue notes in renewal of outstanding notes, and to issue and pledge bonds to secure the payment of the notes. The company has $83,261 of notes outstanding. The payment of $49,393 of these notes is secured by $68,500 of the company's first mortgage 5½ per cent bonds. The company wanted to secure the payment of all the notes which it desired to issue for the purpose of renewing notes outstanding by first mortgage bonds in the ratio of $100 of bonds to $70 of notes.

Receiver for Bowling Green Company.—At Bowling Green, Ky., Judge J. McKenzie Moss has appointed Master Commissioner W. R. Speck as receiver for the Southern Traction Company. The receiver has put one car in operation and hopes within the next few days to have the entire system in operation. The company discontinued service because officials said operation was being carried on at a loss. The City Attorney filed suit for a receiver. Upon the promise of the company to put the cars in operation at once the case was held in abeyance awaiting the fulfillment of the promise. The cars were not put in operation in the time specified and the receiver was appointed.

Bids Rejected.—The property of the Richmond & Chesapeake Bay Railway was offered for sale recently at public auction at the Richmond terminal of the line. L. W. McVeigh, auctioneer of the property, announced that the highest bid would be subject to final ratification by the trustees of the road. The last bidder was B. Colitz, of the Central Iron & Metal Company, Chicago, Ill., at $90,000. The trustees have refused the offer. The auctioneer advised all prospective bidders that the trustees earnestly desired that the purchaser might be some one who purposed operating the road, and insisted that the bidders announce whether their purpose in offering to buy accorded with that object. All the bidders stated that the road was to be used as junk. The company ceased operating in 1917.

Successor Company Organized.—The articles of incorporation of the Petaluma & Santa Rosa Railway, Petaluma, Cal., formed to take over the Santa Rosa & Petaluma Railroad, in the plan to refinance the line, have been filed with the county clerk as required by law. The capital stock of the new corporation is placed at $1,250,000. The incorporators and first board of directors are: Rudolph Spreckels, L. B. Mackey, San Francisco; F. A. Brush, Santa Rosa; George P. McNear, Petaluma; Thomas Maclay, Petaluma; Allen I. Kittle, Ross; E. C. Merritt, Santa Rosa. The purposes of the corporation cover the operation of the lines and rolling stock of the former concern; the establishment of a ferry service to Petaluma, a distance by water of 39 miles; the construction of a new line from Sebastopol to Santa Rosa, and a branch from Liberty Station to Two Rock. The plan for the reorganization was reviewed in the ELECTRIC RAILWAY JOURNAL for Aug. 31, page 387.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILROAD, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$20,097	$13,550	$6,547	$470	$6,077
1m., July, '17	23,326	13,048	10,278	431	9,847

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$230,752	*$147,895	$82,857	$39,425	$43,432
1m., June, '17	164,448	*109,392	55,056	37,568	17,488
12m., June, '18	2,385,304	*1,555,941	829,413	464,291	365,122
12m., June, '17	1,959,871	*1,286,176	673,695	442,230	231,465

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$94,087	*$67,727	$26,360	$19,703	$6,657
1m., July, '17	99,449	*62,693	36,756	15,570	21,186
12m., July, '18	880,545	*741,748	138,797	206,367	†67,570
12m., July, '17	861,823	*637,770	224,053	185,042	39,011

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$248,491	*$160,935	$87,556	$40,372	$47,184
1m., July, '17	197,671	*131,481	66,190	41,343	24,847
12m., July, '18	2,617,697	*1,675,458	942,239	488,583	453,656
12m., July, '17	2,430,215	*1,535,677	894,538	496,071	398,467

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	$939,382	*$566,622	$372,760	$265,736	$107,024
1m., June, '17	755,872	*454,318	301,554	191,438	110,116
12m., June, '18	10,513,263	*6,548,665	3,964,598	2,502,460	1,462,140
12m., June, '17	8,812,115	*5,336,144	3,475,971	2,255,365	1,220,606

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	$816,958	$559,976	$256,982	$164,988	$91,994
1m., July, '17	858,177	567,607	290,570	150,671	139,899
7m., July, '18	5,664,531	4,075,467	1,589,064	1,103,068	485,996
7m., July, '17	6,034,121	3,975,678	2,058,443	1,026,682	1,031,716

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Rebate Slips in Missouri

Both St. Louis and Kansas City Companies Plan This Action Following Court Decision

Starting at 6 a. m. on Sept. 12 the United Railways, St. Louis, Mo., began to give a negotiable receipt for 1 cent to each passenger who pays 6 cents for a ride. This arrangement will continue in effect until the decision of the Supreme Court of Missouri, which will pass upon the validity of the action of the State Public Service Commission in granting the company an increased fare. The company is required to deposit with the Mercantile Trust Company 1 cent for each 6-cent fare received. Passengers must ask the conductor for the receipt. Advertisements published by the company state that the receipt "will be issued on request." In the event the final ruling of the Supreme Court is unfavorable to the railway, those who hold receipts will be paid back the extra cent. It is probable that the case will be heard by the Supreme Court en banc as early as Oct. 21 and not later than Oct. 28.

The order of Circuit Judge Slate in the fare case would have restored 5-cent fares, but Chief Justice Bond of the State Supreme Court on Sept. 7 authorized the companies to continue charging 6 cents until the Supreme Court passes on the case.

The Kansas City Railways, having given a supersedeas bond in the Supreme Court in the matter of higher fare litigation, is planning to give receipts to passengers for the extra cent they pay. The decision of Judge Slate of the Cole County District Court, on Aug. 31, vitiating the increased fare orders of the Public Service Commission, stimulated many passengers in Kansas City to withhold the extra cent from conductors. Newspaper stories of passengers who upon being refused such receipts refused to pay the penny also assisted the tendency. The admission of a bond by the Supreme Court pending final decision by it on the jurisdiction of the State Commission, restored to the public their normal view of the 6-cent fare.

Skip Stops in Los Angeles

The Los Angeles (Cal.) Railway put the skip stop in operation on West Pico Street line on Aug. 7. Up to the third day of operation not a complaint had been registered. On the other hand two persons called in regarding to the location of stops previous to the installation of the new method of operation. In each case their suggestions were deemed of sufficient merit to warrant shifting of the stop, as the suggestions which were made were not controlled by personal or selfish reasons. The company took considerable pains to advertise this method of operation thoroughly. A pamphlet was addressed to the employees of the company. Another was distributed to the patrons on the W. Pico Street line. In addition *A-Z-U-R-I-D-E*, the company's fortnightly publication, was distributed through the city to the extent of 75,000 extra copies. Advertisements were also placed in the papers. The company has placed new stop signs throughout the entire line whether or not in the skip-stop section. The skip stop was only used west of Figueroa Street, which is practically half of the line. As this system is introduced on the lines the company will put new stop signs everywhere. No stops are made except at a sign. Over that portion of the lines where skip stops are not supposed to be in operation the company does skip some stops, as the company is cutting out stops at unimportant streets.

Jitney Regulation Sustained

Jitneys in Texas have lost again in the courts in their fight for existence. Judge George Calhoun of the Fifty-third District Court at Austin, in dissolving the temporary injunction granted several weeks ago restraining the city of Dallas from enforcing the city ordinance enacted on Aug. 2 with the avowed purpose of putting the jitneys in Dallas out of business, recognized the right of cities in Texas to exercise their police powers to regulate traffic of this kind, even to the extent of stopping such traffic altogether.

The decision of Judge Calhoun was made after an exhaustive hearing on the merits of the case, in the course of which the jitney drivers offered evidence of their right to operate unhampered on the streets of a city as public carriers, and the city offered evidence showing the detrimental effect of the jitneys on the morals of a community, how they congested traffic on the downtown streets, how they were not amenable to regulation and other undesirable features of their operation.

Immediately after the temporary injunction was dissolved, Mayor J. E. Lawther of Dallas, who was in Austin at the time, notified Chief of Police Ryan by telephone and instructions were issued to the police officers to arrest all jitney drivers found operating in violation of the ordinance of Aug. 2. This ordinance prohibits the operation of jitneys in the downtown or business district of Dallas.

This decision is regarded as of special importance at this time as it upholds jitney ordinances in nearly all the cities of the State.

Increase Sought in Capital

Both Washington Railways Find Cost and Wage Burdens More Than Present Fares Will Stand

The Washington Railway & Electric Company, Washington, D. C., has petitioned the Public Utilities Commission of the District of Columbia to substitute for the sale of six tickets for 25 cents, as at present, a uniform cash fare of 5 cents per passenger per trip with transfer privileges to connecting lines as provided in the present tariffs. Among other things the company cites increasing costs of material and recent advances in wages as factors contributing to the conditions that make the appeal necessary.

SPEEDY ACTION URGED

The petition was dated Sept. 14. It was signed by William F. Ham, president. In his conclusion Mr. Ham urges that the increase now requested be granted as speedily as possible, together with such other relief, if any, as the commission may deem proper.

On Sept. 18 it became known that the Capital Traction Company informally had notified the Public Utilities Commission that it would seek a higher rate of fare in order to meet the increase of more than $400,000 annually in its payroll, involved in the new pay scale announced last week and other increased costs of operation imposed by war. Formal application, it is expected, will be filed on Sept. 23. Just what form the fare request of this company will take has not yet been made known.

The commission met on Sept. 18, but it did not set a date for the hearing on the petition of the Washington Railway & Electric Company. In view of the appeal of the Capital Traction Company for relief, it is expected that the cases will be heard at the same time, perhaps in a joint proceeding.

LABOR BOARD URGES ACTION

A feature of the case of the Washington Railway & Electric Company is the decided attitude taken by the War Labor Board with respect to the company's appeal. In recommending to the Public Utilities Commission that financial relief be granted to the company, the board has reiterated statements made by it in the Cleveland, Schenectady and other wage cases passed upon by it previously, declaring that alleged "overcapitalization, corrupt methods and exhorbitant dividends in the past are not relevant to the question of policy in the present exigency" and that "in justice the public should pay an adequate war compensation for a service which can not be rendered except for war prices."

In the ELECTRIC RAILWAY JOURNAL for Aug. 17, page 312, it was stated that the Washington Railway & Electric Company would seek an increase. It was not known at that time, however, just what form the application would take.

Indianapolis Fare Hearings Reviewed

Hearings Have Been Going On Since Aug. 19, but Final Arguments Are Expected This Month

The hearing of the petition of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., for increased rates of fare, which began before the Public Service Commission of Indiana on Aug. 19, has proceeded practically continuously since that date.

City Attorney Delays Case

A great deal of delay has been occasioned by the action of the City Attorney of Indianapolis in his cross-examination of the witnesses of the company, who have testified as to the value of the inventory of the street railway property, mention of which was made in the Electric Railway Journal for Aug. 24. The attitude of the City Attorney has been to attempt to discredit the financing of the original properties of the Indianapolis Street Railway and the Citizens Street Railway, which were taken over by lease by the Indianapolis Traction & Terminal Company. The company's valuation of the physical property was given as $24,018,040, and with intangible values added the total was $28,634,210; the total issued securities of the Indianapolis Traction & Terminal Company and underlying leased property amounts to $25,000,000.

H. O. Garman, engineer for the commission, was called on to verify some of the figures used in the company's inventory of the property. He placed a valuation of approximately $15,000,000 on the company's physical property, including the structural overhead, and including the terminal station and property used in connection with the interurban lines entering the city. He stated, however, that possibly a careful valuation of the property might add 20 per cent to his figures or a total of $18,000,000. Mr. Garman based his figures on the "barebones" valuation of $78,700 a mile for the Indianapolis property, and stated that he had taken the valuation per mile in various cities and made certain deductions, giving the comparative "barebones" figures as his estimate for the following cities: Detroit, $48,860; Kansas City, $90,639; Milwaukee, $94,000; Cincinnati, $88,500; St. Louis, $65,700.

Mr. Garman stated that in this estimate he had stripped the valuation of all the questionable percentages, like amounts allowed for engineering costs, superintendence, interest and taxes during construction, small omissions, fire and liability insurance, contingencies, franchise and like valuations.

Robert I. Todd, president of the company, was on the stand for several days verifying figures which had been introduced by other officials.

City Thinks Rentals Too High

The city contended that the rental paid to the stockholders of the Indianapolis Traction & Terminal Company of a 6 per cent dividend, amounting to $300,000 per annum, should be reduced before any increase in fare was considered, if the company was found to be in need of securing additional revenues. It was also contended that the interurban companies should be charged a higher rate per passenger for the use of the tracks and interurban terminal of the city company, to provide additional revenue.

On Sept. 3, after much argument as to the details of valuation on the part of the city, Chairman Lewis of the commission took a decided stand in the case, and stated that at this time it was of little concern what the inventory shows, but it was of very great importance to see that the income of the property was not less than its expenses, so that the company could continue to operate without injury to the services, or danger of insolvency. He said that this was no time for receivership. There are about 1400 public utilities in the State under stress. The commission did not propose to see them wrecked. He was frank to say that the company would be saved from insolvency if any danger of that was shown.

City Representation on Board

On Sept. 5 Commissioner Edwards, who has charge of the case, made a suggestion that public representation be allowed on the board of directors of the company to create confidence in the company on the part of the public, and asked if the company would consider his proposal, that one director should be appointed by the Governor of the State, one by the Mayor of Indianapolis, and one by the Indianapolis Chamber of Commerce and the Board of Trade in conjunction with the other civic organizations of Indianapolis. The company took the matter under consideration and on Sept. 9, unreservedly accepted the proposal of the commission, stating its earnest desire to give the best service possible, and to cooperate in every way for the interest of the public.

An adjournment of the hearing was taken until Sept. 20, when the arguments of the company and the city will be presented, probably closing the hearing.

An Interurban on the Stage

The Arkansas Valley Interurban Railway Company, which operates between the cities of Hutchins, Wichita and Newton, Kan., has completed a motion picture panorama of its entire line. This is to be used principally at the "Wheat Show," an annual event held in Wichita, and scheduled this year for Sept. 30 to Oct. 12. The picture consists of three reels and covers the entire line showing many interesting scenes and the several thriving and prosperous little cities through which the road operates.

The successful filming of the picture, accomplished by M. B. Faidley, well known in Eastern cities and famous for having picturized the Santa Fé Trail, was made under the direction of Fred C. Mayer, traffic manager, of the Arkansas Valley Interurban Railway. Considerable interest has been manifested in the effort to incorporate this line in motion pictures, and a number of Kansas motion picture theaters have already reserved dates for the showing of the film.

This novel scheme of advertising the facilities of a transportation line is being watched with interest by other electric lines, no doubt with a view of some such similar action on their part should the plan fulfill the expectations of its sponsors.

Renews Its Fare Plea

George A. Stanley, president of the New York & North Shore Traction Company, Roslyn, N. Y., has declared that operations will cease one minute after midnight on Sept. 30 unless the city of New York grants the company financial relief or positively signifies intention to do so at an early date. Some time ago the company asked for a 7-cent fare. Mayor Hylan and the other members of the transit committee of the Board of Estimate held a public meeting in Flushing, but no action has been taken by the committee. This matter was referred to previously in the Electric Railway Journal for July 6, page 34.

Six Cents for Houston

The City Council of Houston, Tex., on Sept. 9 adopted a resolution granting the Houston Electric Company a 6-cent fare, an increase of 1 cent. Half fares will be 3 cents, instead of 2½ cents. The new rate becomes effective on Sept. 30 and will remain in operation until the end of the year if there are no further proceedings. At that time the city may order the present rate of 5 cents restored, or it may decide that the company is entitled to a still further increase and declare in favor of a 7-cent rate, which the company has asked for.

All capital expenditures must first be approved by the City Council. Furthermore, the city may demand a detailed statement of the valuation of the property of the Houston Electric Company, which must be furnished either before or after Jan. 1, 1919, the cost to be paid by the company. Until such valuation is made, no dividend is to be declared without giving the city ten days' notice. No dividend can exceed 7 per cent of the present valuation of the property.

The city will have a representative on the board of directors of the company, who will be entitled to inspect the company's books. The railway company is to furnish monthly financial statements of its operations regularly to the city.

Relief for Los Angeles

Case of Pacific Electric Railway, Pending Since May, Decided by Fare Advance in Suburbs

An increase in passenger rates was granted the Pacific Electric Railway, Los Angeles, Cal., by the State Railroad Commission in a decision made on Sept. 4. The opinion was written by Commissioner Harvey D. Loveland.

The application of the company has been pending since May 28. The increased rates authorized are expected to produce less than 20 per cent increase in the gross revenues of the company, which operates approximately 600 miles of trackage in southern California with its center in Los Angeles. The increase, however, will still leave a gap of approximately $1,000,000 between the amount of revenue produced and the amount necessary for the expenses estimated during the year ending May 31, 1919.

5½ MILE CENTRAL ZONE

The new rate is based upon a central zone in Los Angeles extending 5½ miles, radius from the Pacific Electric and Hill Street stations. In this zone the rate of fare is 5 cents. All mileage rates are computed from the edge of this zone to the point of destination on mileage basis plus the 5 cent rate. The mileage rate fixed by the commission for one-way fares is 3 cents a mile with half fare for children over five and under twelve years of age; round-trip fares to be at the rate of 2½ cents a mile, with half fares as before stated. Commutation tickets are ordered to be ten-ride individual at 2 cents a mile; thirty-ride family, at 1½ cents a mile; and a forty-six-ride individual school, and a sixty-ride individual at 1 cent a mile up to 10 miles; at 9 mills a mile from 10 to 15 miles, 8 mills a mile from 15 to 20 miles and 7½ mills a mile over 20 miles.

The commission also grants an increase in what is known as the beach zone rates. The beach zone rates are treated largely as excursion and are increased from 35 to 40 cents one-way, and from 50 to 60 cents round-trip. No discrimination has been made in reference to reduced rates to industrial or other zones.

Local fares inside the city of Los Angeles are not to be increased, and the zone computation is only to be used for interurban rides.

The rates authorized may be established at any time within twenty days.

SEVEN-CENT PLEA REJECTED

In dismissing the request of the company that it be permitted to charge zone fares up to 7 cents in the city of Los Angeles, the commission holds that while the government is computing war taxes and all other affairs upon the 1 cent basis, it is not difficult to continue to do so in all other affairs. Hence, the desire of the company to compute its rates wherever the amount exceeded 2½ cents on a basis of 5 cents, and where less than 2½ cents on a basis of nothing, has been denied and the rates will be computed on the 1 cent basis. Where fares come out on an even half cent or over, they are to be rounded up to an even cent, but where below, the fractions are to be discarded.

Meeting the request of City Attorney Stephens at Los Angeles that the rates be based upon the valuation of the property, the opinion states that this valuation is in the process of making by engineers of the commission and the railroad, and is practically 75 per cent finished. It is pointed out that the revenue allowed the company is equal to only 6 per cent upon less than $32,000,000, while the undisputed value of the property devoted to public service is a value in excess of $50,000,000. The commission urges that the work on the valuation be carried on to completion for use in further rate considerations.

The decision of the commission was prompted by the financial conditions of the company, the necessity of continuing its service for a large population —the largest population that has been affected by single rate decision in the history of the Railroad Commission—the increased cost of materials due to war conditions, the reduction of traffic due to the growth of automobile transportation and the direct appeal of the federal administration to state commissions to maintain during the war crisis the financial stability of public utilities.

NEW RATE IN EFFECT SEPT. 15

O. A. Smith, general passenger agent for the Pacific Electric Railway, announced on Sept. 5 that the new rate schedule recommended by the State Railroad Commission would go into effect about Sept. 15. Interurban fares will be figured on the basis of 3 cents a mile one-way or 2½ cents per mile for round-trips.

The mileage schedule will not apply between Los Angeles and the beaches, from Santa Monica on the north to Seal Beach on the south, but this fare will be increased from 35 cents one-way and 50 cents round-trip to 40 cents one-way and 60 cents round-trip, respectively.

In constructing one-way, round-trip, ten and thirty-ride commutation fares from Los Angeles, a blanket fare of 5 cents will be applied for the first 5½ miles and mileage rates beyond. Fares will end in denominations of 1 cent instead of 0 or 5, as formerly. The distance from Los Angeles to Covina is 21.78 miles; deducting 5½ miles leaves 16.28 miles at 3 cents per mile, which amounts to 49 cents, and, adding 5 cents for Los Angeles city fare, makes the total one-way fare 54 cents from Los Angeles to Covina.

The sixty-ride commutation fare between Los Angeles and Long Beach or between Los Angeles and San Pedro, which is used to a considerable extent by employees of the shipbuilding plants, will be $9.20. This is figured at rate of 7½ mills per mile on the distance between Los Angeles and Long Beach, 20.45 miles.

Brief mention of the handing down of the decision was made in the ELECTRIC RAILWAY JOURNAL for Sept. 14, page 479.

Transportation News Notes

Six Cents in Racine.—A 6-cent fare for adults and a 3-cent fare for children was granted the Milwaukee Heat, Light & Traction Company, operating in Racine, Wis., by the State Railroad Commission on Sept. 10.

Kankakee Council Willing. — The Council of Kankakee, Ill., has passed an ordinance authorizing the Kankakee Electric Railway to charge a 6-cent fare, provided the change is approved by the Illinois Public Utilities Commission.

Fare Increase in Pascagoula.—The Pascagoula Street Railway & Power Company, Pascagoula, Miss., has raised the rate to Moss Point 6 cents, making the price of the trip from Pascagoula to Moss Point 21 cents instead of the former sum of 15 cents.

Shop Early Plea in New Jersey.—The Public Service Railway, Newark, N. J., has posted the following placards in the cars on the various divisions: "War workers are increasing, thus making it more urgent that women shop early in the day."

Rockford Wants Six Cents.—The Rockford (Ill.) City Traction Company has filed with the Public Utilities Commission of Illinois a request for a rehearing in the matter of 6-cent fares for Rockford. The commission recently fixed fares in the city of Rockford at 5 cents.

Uniform Findings.—The finding of the Utilities Commission of Kansas in the fare and freight rate matter of the Joplin & Pittsburg Railway, Pittsburg, Kan., was the same as that for the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., referred to previously in the ELECTRIC RAILWAY JOURNAL.

Increase for Evansville Railways.—The Interstate Commerce Commission recently authorized the Evansville (Ind.) Railways, operating the interurban line from Henderson, Ky., and Evansville, Ind., to increase its fares between those two points and intermediate stations, not to exceed 10 per cent.

Chattanooga Hearing Held.—The City Commission of Chattanooga, Tenn., held a hearing on Aug. 20 on the application of the Chattanooga Railway & Light Company, Chattanooga, Tenn., for a 6-cent fare. Both the opposition and those in favor of the change were heard. The matter is still open.

Increase Refused in Binghamton.—The petition of the Binghamton, (N. Y.) Railway for an increase in fares, failed to pass the Common Council on Sept. 9, although the report of the committee in charge of an investigation asked for its acceptance. Twelve Aldermen were present and when a vote was taken ten negatives and two affirmatives were recorded.

Parcel Dispatch Advertised.—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., is advertising the service which its North Shore parcel dispatch is prepared to give. Patrons are assured of merchandise being delivered within twenty-four hours and frequently in less time if purchases are made early in the day and promptly delivered to the station.

Winnipeg Will Ask More.—With 60 per cent increase in salaries being demanded by the employees, the Winnipeg (Man.) Electric Railway informed the City Council on Sept. 10 that it is preparing to ask for the right to increase fares. The company's maximum demand will be 7 cents, with unlimited transfers as now, or 6 cents for tickets and 1 cent for transfers, it is understood.

Columbus, Ind., Wants Fare Increase.—The Central Indiana Lighting Company, which operates the railway in Columbus, Ind., has filed a petition with the Public Service Commission of Indiana asking for authority to increase fares from 5 cents to 7 cents. The company announces that in the event of the rejection of the petition by the commission it will take steps to dismantle the lines and discontinue all service.

Accountant Begins Fare Study.—J. R. Lamb, Cincinnati, Ohio, an expert accountant, who has been engaged by the Louisville Board of Trade to examine the books of the Louisville (Ky.) Railway, with a view to determining whether the latter has a valid reason to ask the city administration for permission to raise fares from 5 cents to 6 cents, or even more, has begun his work. A comparative statement of the cost of operation in 1914 is being prepared for him by the company.

Federal Investigator in Cleveland.—C. S. Lake, inspector for the traffic department of the Federal Railroad Administration, was in Cleveland, Ohio, on Sept. 11, looking into the facilities of interurban railways for carrying freight in less than carload lots. His report will determine the action of the government in the proposal to loan the interurban railways funds for the purchase of freight equipment. E. F. Schneider, general manager of the Cleveland, Columbus & Southwestern Railway, said that freight trains will be operated in the night largely, if Mr. Lake's report is favorable to hauling freight.

Grand Rapids Wants Seven Cents.—Following up its request of June 3, when it asked the City Commission for a 6-cent fare, the Grand Rapids (Mich.) Railway, through Benjamin S. Hanchett, president, has sent in a new request to the commission, this time for a 7-cent fare. Mr. Hanchett informed the commission that the data it asked concerning the financial history of the company had been compiled and would be presented by him to the commission for a hearing whenever the commission desired.

New Keyport Tariff Suspended.—The Board of Public Utility Commissioners of New Jersey, on Sept. 12 ordered the suspension of the proposed increases in the existing fares of the Jersey Central Traction Company, Keyport, N. J., until Dec. 10 next unless the board prior to that date shall determine that the increases are just and reasonable and shall approve them. A hearing on the matter will be held at the State House, Trenton, on Nov. 12. The company filed with the board a schedule of passenger fares to take effect on Sept. 22.

Commission Approves Turnstiles.—The attitude of the Public Service Commission of the First District of New York on the subject of turnstiles has been somewhat misunderstood. Last spring the subject came up in connection with an application of the New York Municipal Railway Corporation (Brooklyn Rapid Transit System) to use turnstiles in some of its stations. The commission's decision in that case was against their use in stations with very heavy traffic. Since then, however, passimeters of the automatic type have been permitted in several of the most busy stations of the New York Municipal Railway.

Jersey Fare Argument Before Court Oct. 5.—After an agreement between George L. Record and Frank Bergen, representing the New Jersey League of Municipalities and the Public Service Railway, Newark, N. J., respectively, it was decided on Sept. 12 to argue the application of the municipalities for a writ of review in the 1-cent transfer case before Justice Swayze in Jersey City on Oct. 5. Justice Swayze has indicated that the writ will be allowed, but he wants to hear argument on the question of whether or not the Public Service Railway is to be allowed to collect the 1-cent for transfers pending the litigation.

Bridge Fare Increase Allowed.—Permission to increase fares over the Eads Bridge from 10 to 11 cents was granted to the East St. Louis (Ill.) Railway on Sept. 5 by the Interstate Commerce Commission. Several weeks ago the East St. Louis & Suburban System, of which the railway line over the bridge is a part, was authorized to raise its fares to 6 cents. This authority came from the Public Utilities Commission, of Illinois, which had no jurisdiction over cars running between Illinois and Missouri over Eads Bridge. The action by the Interstate Commerce Commission extends the 6-cent authority so that this amount may be collected in addition to the regular 5-cent bridge fare.

Omaha Wants Seven Cents.—At a hearing before the State Railway Commission on Sept. 9 on the application of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for leave to collect a fare of 6 cents in lieu of the present fare of 5 cents, John L. Webster, general counsel for the company, filed an amended application asking for permission to charge a fare of 7 cents. The additional 1 cent increase was asked for on account of alleged change in conditions since the filing of the original application, including a further increase in the cost of supplies and material and an increase in wages which the company is paying, the wage increase being paid in accordance with an order of the War Labor Board.

Auto Stages Increasing in California.—Interurban buses are increasing in numbers and popularity about as rapidly as the jitney bus on the city streets is disappearing. There are now more than 2000 interurban buses operating in California. They probably handle about 20,000 passengers daily. These buses are owned by about 750 companies now licensed to operate in the State. In the first six months of 1918 it is estimated that 2,000,000 passengers were carried on interurban buses south of the Tehachapi Pass, and in the northern part of the State it is estimated that an equal number has been handled. Several successful motor freight lines are operating despite the fact that it has not been believed that this business would be found profitable.

Increase in Salamanca.—The Western New York & Pennsylvania Traction Company, Salamanca, N. Y., has been granted permission by the Public Service Commission of the Second District to increase its fares in Salamanca, Bradford and Olean from 5 cents to 7 cents. In granting permission for the change in the company's franchise, the municipal authorities of Salamanca have attached certain restrictions, one of which is that the additional 2 cents cannot be collected from passengers longer than three years after the date of the ordinance, but may be continued one year after the close of the war. The company may also charge a fare of 3½ cents a mile on its interurban lines between these points and Little Valley, Bolivar, Portville and Limestone.

Lincoln Fare Decision Appealed.—The Lincoln (Neb.) Traction Company has filed notice of appeal from the order of the State Railway Commission which allows the company to increase its fares in Lincoln to 5 cents within the city zone and 6 cents outside that zone. The company asks for a transcript of the evidence taken at the hearing and that it be filed in the Supreme Court as provided by law in appeal cases. No other reason is given in the notice of appeal except that the company is dissatisfied. The order of the commission carried with it several conditions, one of which commands the company not to pay dividends on its common stock; that it proceed to recover $198,228 paid out since 1912 to the holders of this stock and that it take steps to cancel the $1,652,000 of common stock. The fare case was before the commission in applications Nos. 3066, 3298 and 3461.

Eight Cents in Scranton and Wilkes-Barre.—Agreement to permit 8-cent fare to be collected on cars in the Wyoming Valley was reached at the session of the Public Service Commission of Wilkes-Barre, Pa., on Sept. 13. Chairman W. D. B. Ainey of the commission ordered the Wilkes-Barre Railway and the Scranton Railway to offer patrons a refund slip that will remain in effect until a final decision, and made it clear that patrons must not be embarrassed nor compelled to ask for the slips. W. E. Boileau, general manager of the Scranton Railway, wanted to know if it would be all right to give three 1-cent slips instead of a one 3-cent rebate ticket when the 8-cent rate becomes effective. He was told by Mr. Ainey that one slip is to be given with each fare. If old rebate tickets are used there must be some mark indicating that it was issued after the fare was raised from 6 cents to 8 cents.

One-Third Its Employees Gone.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, has replied to the Public Service Commission for the First District of New York with respect to its order requiring the company to operate ten-car express trains on a two-minute headway and six-car local trains on a three-minute headway in both morning and evening rush hours on the east side and west side subways. He says that the service is not what the company had hoped it would be when the new subways were put in operation, but that the conditions which prevent the company from giving greatly improved service are beyond its control. The company has plenty of cars and plenty of power, but it lacks men. During the year out of a total of employees numbering about 14,000 the company has lost about 2000 men to the army and navy. In addition about 3000 experienced men have gone into war industries, munition plants, etc. Five hundred women are being employed in the subways and every effort is being made to obtain additional employees. Wages have been raised. Mr. Shonts asks the forebearance of the people during the difficult war times. *The Subway Sun* for Sept. 16, posted in the cars of the company, was given over to presenting these facts to passengers.

Personal Mention

W. F. Ham, President

Former Vice-President and Director of Washington Railway & Electric Company Heads Company

William F. Ham, who has been acting as president of the Washington Railway & Electric Company, Washington, D. C., since the resignation of Clarence P. King, in March, 1918, was elected president of the company on Sept. 12.

Mr. Ham has had more than twenty-five years of electric railway experience, and during this time he has established a high reputation as an administrator and operator. He has also taken a very active part in association work, especially with the Accountants' Association. He was one of the prime movers in the organization of this association and was vice-president in 1899-1900 and president in 1900-1901. His most important service to the association, however, probably has been as a member of its important committee on the standard classification of accounts, on which he has continuously served from the time of the organization of the committee at the first meeting of the association until the present time and as chairman of the committee from 1905 to 1911. It was in recognition of the value of his work on this and other committees of the Accountants' Association that the organization took the unusual action some six years ago of presenting Mr. Ham with a silver salad bowl.

Harris & Ewing Photo

W. F. HAM

Mr. Ham's corporation career has been one of continuous promotion. His first connection with electric railway work was from 1892 to 1895 in the New York office of the Lorain Steel Company. In this way he became associated with Tom L. Johnson and Albert N. Johnson and in 1895 he accepted the office of secretary of the Nassau Electric Railroad, Brooklyn, N. Y., one of the Johnson properties. He continued in this position until the Nassau Electric Railroad was acquired by the Brooklyn Rapid Transit Company early in 1899. He was than appointed auditor of the Brooklyn Rapid Transit Company and served until December, 1899, when he accepted the position of comptroller of the Washington Railway & Electric Company. The following year he was also elected treasurer of the company. In December, 1911, after eleven years' work with the Washington property, he was elected first vice-president and a director of the company to succeed George H. Harries, who became connected with H. M. Byllesby & Company, public utility operators, Chicago.

Since he has been in Washington Mr. Ham has confined his business activities strictly to the Washington Railway & Electric Company, except for being a director of the Federal National Bank. During his connection with the company the gross earnings have increased from $2,000,000 a year to more than $6,500,000 a year.

Mr. Taylor on Tour

Director of Transportation on Inspection Trip to Pacific Coast—Appointments Announced

A Merritt Taylor, director of passenger transportation and housing for the United States Shipping Board, Emergency Fleet Corporation, has left Philadelphia for the Pacific Coast on an official tour of investigation. He will inspect all transportation lines that touch the shipyards and will decide many important problems of line extension and housing. Mr. Taylor's tour will occupy about three weeks and will thoroughly cover the Pacific Coast yards south from Seattle.

Mr. Taylor has announced the appointment of Garrett T. Seely, former assistant director of transportation, as assisant director of passenger transportation and housing.

J. Willison Smith, former assistant director of housing, has been appointed assistant director of passenger transportation and housing also.

The change in the official designation of Mr. Taylor's two assistants was made to give authority to Messrs. Seely and Smith to direct the affairs of the passenger transportation and housing division during the absence of Mr. Taylor.

As noted elsewhere in this issue, Mr. Taylor is reported from Seattle to have assisted toward the proposed settlement of the transportation problem there which provides for the city taking over the local railway lines.

William B. McKinley, president of the Illinois Traction Company, Peoria, Ill., and a member of Congress from the nineteenth Illinois district, expects to visit the western battlefront this fall, as a member of a party of Congressmen.

J. F. Canfield has been appointed auditor of the Ottumwa Railway & Light Company, Ottumwa, Iowa, to succeed Crad Brazel, who is now auditor of the construction department of the Northern States Power Company, Minneapolis, Minn.

J. J. Chisholm, superintendent of the Market Street power house of the New Orleans Railway & Light Company, New Orleans, La., has severed his connection with the company and accepted a position with the Woodward Iron Company, Woodward, Ala.

Elmer G. Fay has been appointed assistant treasurer of the Trinidad Electric, Transmission, Railway & Gas Company, Trinidad, Col., to succeed Hubert J. Wightman, resigned, who has gone into business for himself in Trinidad as a public accountant.

H. W. Smith has been appointed claim agent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend & Northern Indiana Railway, and the Southern Michigan Railway, South Bend, Ind., to succeed E. R. Dow.

J. C. MacPherson, superintendent of the electrical lines of the Southern Pacific Company's transbay system, with headquarters at Oakland, Cal., who has held that position since the installation of the system several years ago, has resigned. Mr. MacPherson has received a commission as captain in the Engineers' Corps, U. S. A., and expects to leave for France immediately.

George M. Mattis has been elected vice-president of the Chicago, Ottawa & Peoria Railway, with headquarters at Champaign, Ill. Mr. Mattis has also been elected treasurer of the company to succeed Edward Woodman. The company is included in the Illinois Traction System. Mr. Woodman continues as a director of the Illinois Traction Company and as vice-president and director of the Western Railways.

Joseph H. Towle, after seven years service, has resigned as master mechanic for the American Railway Company's Dayton and Springfield (Ohio) properties, to join the Railway Improvement Company as assistant electrical engineer as of Oct. 1. Mr. Towle's father is George C. Towle, general manager Peoples Railway, Dayton and the Springfield Railway. His headquarters will be at the New York office.

Edward J. Cooney, executive assistant of the Rhode Island Company, Providence, R. I., in charge of publicity and editor of that company's weekly publication, *The Trollier*, has resigned from the company. Mr. Cooney has had many years' experience in editorial, general publicity and advertising work. Before becoming connected with the Rhode Island Company he was assistant sales manager of the Screw Machine Products Company.

Charles A. Smyth, who for a number of years has been general manager of the Arkansas Valley Interurban Railway, Wichita, Kan., has just returned from France where he has been in the service of the American Red Cross Society, and will again assume active management of the railway. Mr. Smyth spent about seven months in Europe and his description of the conditions "over there" are reassuring, instructive and immensely entertaining.

T. H. Williams, who succeeded J. C. MacPherson as superintendent of electrical lines of the Southern Pacific covering Oakland, Alameda and Berkeley, has been promoted to the position of assistant general manager of the Southern Pacific lines south of Ashland, Ore. The announcement was recently made by W. R. Scott, federal manager of the Southern Pacific-Western Pacific lines. T. F. Rowlands, who has been superintendent of the Western division of the Southern Pacific electric lines at Oakland pier, has had his jurisdiction extended to cover the district which has been under Mr. Williams' supervision.

Hubert J. Wightman, who for more than five years has been assistant treasurer of the Trinidad Electric, Transmission, Railway & Gas Company, Trinidad, Col., has resigned his position, and in the near future will establish himself in Trinidad as a public accountant. After serving as a bookkeeper and clerk for several years, he became associated with Niles & Niles as an accountant, and served with them for more than a decade, severing connection with them after having had charge of their Boston office for more than a year. He resigned from their employ to become connected with the company in Colorado.

R. D. Long, for the last twelve years connected with the electrical engineering department of the Winnipeg (Man.) Electric Railway, has resigned from that position. For the first six years of this time Mr. Long was assistant chief engineer and for the last six years he has been chief electrical engineer. As such he has had full charge of all installations and operations of the company's electrical system, including the hydrogenerating plant and high-tension transmission systems and receiving and distributing stations at Winnipeg, as well as the underground and overhead low-tension distribution for electric light, power and railway service.

James Theron Rood has been appointed professor of railway electrical engineering at the University of Illinois. Professor Rood takes charge of the department formerly administered by Prof. A. M. Buck, now with John A. Beeler. Professor Rood was graduated from the Worcester Polytechnic Institute in 1898 with the degree of bachelor of science and received the degree of doctor of philosophy from Clark University in 1906. He was instructor in physics and mathematics at Ursinus College from 1906 to 1907, instructor in physics and electrical engineering at the University of Alabama from 1907 to 1909, and since 1909 has been professor of electrical engineering at Lafayette College.

Obituary

Douglas Robinson, capitalist and real estate dealer, died on Sept. 12 from heart disease at Amsterdam, N. Y. He was in his sixty-fourth year. Mr. Robinson was widely known in New York State, and for a number of years was one of the leading figures in New York City realty transactions. He was co-receiver with Adrian H. Joline of the Metropolitan Street Railway, New York, N. Y., the predecessor of the New York Railways.

Willard Harding Burroughs, secretary and treasurer of the Memphis (Tenn.) Street Railway, is dead. He succumbed to acute uremic poisoning after only a few hours' illness. Mr. Burroughs was born forty-five years ago in Shelby County, Missouri. He was educated to become a lawyer, and in 1895 was licensed to practice law in Missouri. In 1903 he entered the accounting department of the United Railways, St. Louis. In March, 1905, he went to Memphis as secretary and treasurer of the Memphis Street Railway. Mr. Burroughs is survived by his widow and one daughter.

William Kent, eminent consulting mechanical engineer of New York City, died at his summer home at Gananoque, Ont., on Sept. 18, at the age of sixty-eight years. Dr. Kent was possibly most widely known through his "Mechanical Engineer's Pocket Book," written in 1895 and now in its ninth edition. He was for five years dean of the L. C. Smith College of Applied Science of Syracuse University, and for four years editor of *Industrial Engineering*. Before going to Syracuse he was associated editorially first with the *American Manufacturing and Iron World*, later for a considerable period with *Engineering News*. He was a prolific writer, lecturer and inventor, and maintained throughout his life an active interest in the national societies related to his engineering and educational work. An extended article by him, comparing the designs of the three principal electric railway power stations which had recently been erected in New York appeared in the issue of this paper for Oct. 5, 1901. Dr. Kent was admired and respected for his courageous advocacy of the principles he believed to be right, and he accomplished much in the three fields of engineering, education, and technical literature.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS
FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Recent Priority Regulations

War Industries Board Acts on Brass Conservation—Classification of Important Industries Under Sept. 9 Order

Following a conference of the brass manufacturers with B. M. Baruch, chairman of the War Industries Board, and other members and officials of the board, and representatives of the Navy and the Emergency Fleet Corporation, and a later conference of the board with the war service committee of the surface-type condenser industry, it was decided in order to conserve brass to regulate distribution of those condensers which are essential to ships.

There are about forty-five manufacturers affected by the decision of the War Industries Board. They are being notified to take no further orders and enter into no new contracts for sale or to sell or deliver to any purchaser, government or civilian, except on a permit issued by the War Industries Board. To get such a permit the proposed purchaser must show his need to the satisfaction of the board.

The manufacturers will be permitted to fill, where possible, existing orders with non-ferrous condenser tubes on contracts for shipment prior to Jan. 1, 1919. On contracts after Jan. 1, 1919, the manufacturers are urged to put steel tubes on condensers for land uses and are directed to send immediately estimates for steel required.

The Navy and the Emergency Fleet Corporation are exempt from these orders and regulations of the War Industries Board as to condensers for ship usage, but not as to condensers for land stations.

Some months ago the government took over control of and distribution of the turbine-engine industry because of the shortage in the supply and their essential need in the Navy and Emergency Fleet war program. The non-ferrous condenser is an essential integral part of the turbine, and shortage in its production caused the Navy and Emergency Fleet Corporation officials to appeal for government regulation of production and distribution.

CLASSIFICATION OF RAILWAY INDUSTRIES

An abstract of the priority order classifying all industries into four groups, issued Sept. 9, was published on page 471 of this paper for last week. For the convenience of readers the actual classification of some of the principal electric railway manufacturing industries is reprinted here. (The term principally as used in the following means 75 per cent or more):

Brass and copper—Plants engaged in rolling and drawing copper, brass and other copper alloys in the form of sheets, rods, wire and tubes—2.

Cranes—Plants engaged principally in manufacturing locomotive or traveling cranes—2.

Electrical Equipment—Plants engaged principally in manufacturing same—3.

Public Utilities—Street railways, electric lighting and power companies, gas plants not otherwise classified, telephone and telegraph companies, water supply companies, and like general utiltities, also plants engaged principally in manufacturing equipment for railways or other public utilities—2.

Steel Rail Mills—Rolling rails fifty or more pounds per yard—2.

Stoker Manufacturers Organize

A national organization known as the Stoker Manufacturers Association has been voluntarily formed by automatic mechanical stoker manufacturers primarily to so improve the engineering and business sides of the stoker industry as to render it more efficient and better equipped to utilize coal more economically and to serve better the government during the war. The movement is in no sense a business combination.

Under war conditions capacity and economy are the big factors in stoker operation. Improvements are to be expected as a result of technical discussion and interchange of ideas at annual conventions to be held by the association. The organization will also insist upon uniformity of guarantees which will relate only to the stoker and not as hitherto include the performance of the boiler and draft-producing apparatus. The War Industries Board was quick to accept the offer of assistance made by the association, asking only that each manufacturer make an individual monthly private report of conditions of the trade direct to the government in order that each might secure proper priorities to facilitate deliveries to essential industries.

The executive committee of the association includes: President, P. A. Poppenhusen, Green Engineering Company, Chicago; vice-president, S. L. Nicholson, Westinghouse Electric & Manufacturing Company, East Pittsburgh; secretary-treasurer, F. H. Daniels, Sanford Riley Stoker Company, Ltd., Worcester; W. F. Sauter, American Engineering Company, Philadelphia; W. H. Rea, Detroit Stoker Company, Detroit.

Coal Production Situation

Labor Day Causes Loss In Output, Although Compared With Last Year the Results Are Very Favorable

Production of bituminous coal during the week of Sept. 7 while limited by the loss of time on Labor Day exceeded production during the week of July 6 when production was also limited by a holiday by 1,000,000 net tons, according to the weekly report of the Geological Survey. The output during the current week (including lignite and coal made into coke), is estimated at 11,249,000 net tons, a decrease compared with the week preceding of 1,455,00 net tons or 11.5 per cent, and an increase over the corresponding week of last year by 1,257,000 net tons or 11.2 per cent. The average production per working day during the week of September 7 (five and ½ days), is estimated at 2,110,000 net tons as against 2,117,000 net tons during the week of August 31 and as against 1,874,000 net tons during the same week of 1917. The loss of time during the current week places production for the coal year to date approximately 17,000,000 tons behind the summer requirements outlined by the U. S. Fuel Administration and makes necessary an average daily production during the balance of the coal year of 2,041,000 net tons to make up this deficit. This, it will be noted, is 3.2 per cent in excess of the average daily production for the coal year to date.

Production of anthracite during the week ended Sept. 7 is estimated at 1,617,597 net tons, 28 per cent less than the production during the week preceding, due mainly to loss of time on Labor Day, and 3 per cent less than the corresponding week of last year. The daily average during the week of Sept. 7 is estimated at 323,516 net tons as against 338,111 net tons during the coal year to date and as against 330,081 net tons, the daily average during the corresponding period of 1917. The total production for the coal year to date is estimated at 45,645,597 net tons, an increase over the same period of last year of 2.4 per cent.

The Roller-Smith Company, 233 Broadway, New York, N. Y., has appointed W. G. Merowit as its Buffalo agent, with offices at 716 Ellicott Square. Mr. Merowit will handle the Roller-Smith Company's lines of instruments, meters and circuit breakers in the western part of the State of New York.

Little Demand for Pole Erection Tools

Ash to Manufacture Handles Is Now More Difficult to Obtain Than Steel

To determine the market condition of pole erection equipment in so far as demand is concerned is simply to answer the question, "How much new construction work is there going on?" This equipment is seldom purchased except for new construction, and when the construction is completed the equipment is adequate for several years for maintenance purposes. The present financial status of public utilities in general, plus the urgent requests of the government, prohibit any new construction that is not absolutely essential to industry and public welfare.

This answer to the foregoing question bears out the report of manufacturers that there is little demand for such articles as pikes, cant hooks, shovels, spoons, picks, digging bars and "jimmies." Because of the small demand and poor prospects for any immediate need very little stock is being carried. A small quantity of shovels and spoons is kept on hand, but few of the other tools. Although steel is a scarce commodity, it is reported that for the manufacture of pole erection equipment wood for handles is obtainable in still smaller quantities. Steel can be manufactured, but wood has to be grown. A few years ago certain manufacturers of these tools specified and would accept only second-growth ash with straight grain. Later they were requested to and did accept other than second growth, and still later ash with the grain at a slight angle to the axis of the handle had to be accepted. This was followed by the use of maple as well as ash, and at the present time little but maple can be obtained.

All tools are up in price, and those used in the erection of poles are no exception, as they have come in for an advance of from 50 to 75 per cent. Only last week prices advanced 10 to 15 per cent on this line. Delivery of orders in any considerable quantity may be somewhat delayed.

No curtailment of types has as yet been reported. In other construction and digging lines, however, there has been a marked reduction in the number of types produced.

Commission Rules Against Commercial Bribery

The Federal Trade Commission has ordered a chemical company in Chicago to discontinue the practice admitted to have been employed by some of its salesmen of giving gratuities such as liquor, cigars, meals, entertainment, souvenirs, etc., to employees of its customers and prospective customers with a view to influencing the purchase of supplies. The company, which manufactures industrial chemicals, admitted further to have spent money for the entertainment of its customers. The company accepted the issuance of the commission's order without presenting testimony in support of the practice.

Revised Wiring Device Schedule

Reduction of 68 Per Cent in Types Recommended by Manufacturers' Committee

Manufacturers of wiring devices, acting through the wiring device committee of the general war service committee of the Electrical Manufacturing Industry, have prepared a revised schedule of essential devices to be retained in their listings. Each manufacturer has been asked to check carefully his line of devices as cataloged and report to the chairman his elimination. The extent of the elimination is shown in the following:

	Number Devices Now Listed	Number Retained	Per Cent. Reduction
Sockets and Receptacles..	100	20	80
Cut-outs and fuses........	500	125	75
Miscellaneous	25	20	20
	625	165	68

The War Industries Board will not permit development for commercial purposes during the period of the war, and especially no manufacturer will be permitted to duplicate the essential devices of some other manufacturer as scheduled herein, provided he is not now making them.

Similar work having as its motive the elimination of many types in accordance with the wishes of the War Industries Board is under way in about twenty-five group committees of the electrical industry.

NEW YORK METAL MARKET PRICES

	Sept. 11	Sept. 18
Copper, ingots, cents per lb	26	26
Copper wire base, cents per lb	29.25	29.25
Lead, cents per lb	8.05	8.05
Nickel, cents per lb	40	40
Spelter, cents per lb	9.75	9.85
Tin, Chinese*, cents per lb	.....	.....
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

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* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Sept. 11	Sept. 18
Heavy copper, cents per lb	23.50 to 24.50	23.50 to 24.50
Light copper, cents per lb	21.00 to 21.50	21.00 to 21.50
Red brass, cents per lb	23.00 to 24.00	23.00 to 24.00
Yellow brass, cents per lb	16.00 to 16.50	15.50 to 16.00
Lead, heavy, cents per lb	7.50 to 7.75	7.50 to 7.75
Zinc, cents per lb	7.50 to 7.75	7.50 to 7.75
Steel car axles, Chicago, per net ton	$41.52	$41.52
Old carwheels, Chicago, per gross ton	$29.00	$29.00
Steel rails (scrap), Chicago, per gross ton.	$34.00	$34.00
Steel rails (relaying), Chicago, gross ton	$60.00	$60.00
Machine shop turnings, Chicago, net ton.	$16.25	$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	Sept. 11	Sept. 18
Rubber-covered wire base, New York, cents per lb	30 to 37	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40 to 36.75	32.40 to 36.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	35.00 to 37.72	35.00 to 37.72
T rails (A. S. C. E. standard), per gross ton	$70.00 to $80.00	$70.00 to $80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$67.50	$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$62.50	$62.50
T rail, high (Shanghai), cents per lb	4¼	4¼
Rails, girder (grooved), cents per lb	4¼	4¼
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	*3¼	*3¼
Tie plates (brace type), cents per lb	*3¼	*3¼
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	*3¼	*3¼
Angle plates, cents per lb	*3½	*3½
Angle bars, cents per lb	*3¼	*3¼
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount	79%	79%
Waste, wool (according to grade), cents per lb	16 to 40	16 to 25
Waste cotton (100 lb. bale), cents per lb	12 to 13	11 to 16
Asphalt, hot (150 tons minimum), per ton delivered	$38.50	$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$42.50	$42.50
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.90	$1.90
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.92	$1.92
White lead (100 lb. keg), New York, cents per lb	14	14
Turpentine (bbl. lots), New York, cents per gal	66½	66½

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* Government price. † These prices are f. o. b. works, with boxing charges extra.

Recent Incorporations

Petaluma & Santa Rosa Railway, Petaluma, Cal.—Articles of incorporation have been filed with the County Clerk by the Petaluma & Santa Rosa Railway, which has been formed to take over the Santa Rosa & Petaluma Railroad in the plan to refinance the line. The company purposes to operate the present lines and rolling stock of that company, to establish a ferry service to Petaluma, a distance by water of 39 miles, and to construct a new line from Sebastopol to Santa Rosa and a branch line from Liberty Station to Two Rock. Capital stock, $1,250,000. Incorporators and first board of directors: Rudolph Spreckels and L. B. Mackey, San Francisco; George P. McNear and Thomas Maclay, Petaluma; F. A. Brush and E. C. Merritt, Santa Rosa, and Allen I. Kittle, Ross.

Franchises

Alameda, Cal.—The San Francisco-Oakland Terminal Railways has asked the Railroad Commission of California for authority to build a double-track street railroad across the tracks of the Southern Pacific Company just east of Webster Street and north of the Alameda Marsh Line, Alameda, Alameda County. This crossing is in connection with the San Francisco-Oakland Terminal Railways' line under construction from Webster Street across the Alameda Marsh to the Liberty Shipbuilding Yards now being built by the United States Shipping Board Emergency Fleet Corporation.

Gloucester, N. J.—The Public Service Railway has received a fifty-year franchise from the City Council of Gloucester for the construction of an extension from Broadway to Warren Street. The new line will run to the new shipyard village at Yorkship and the work will be begun soon.

Portland, Ore.—The Kenton Traction Company has received a franchise from the City Council to operate its cars over the Derby Street approach to the Interstate Bridge.

Track and Roadway

Muscle Shoals Traction Company, Florence, Ala.—The Muscle Shoals Traction Company has received a guarantee of the total amount of subscriptions required from Limestone County, together with a guarantee of the right-of-way, which will be donated for the company's main line extending from Huntsville to Florence. The Florence Chamber of Commerce has guaranteed right-of-way in Lauderdale County and terminal facilities in Florence. The survey has been completed from Huntsville to a point 7 miles from Florence. Thurston Allen, Florence, secretary. [Aug. 3, '18].

Washington-Virginia Railway, Washington, D. C.—It is reported that an extension is being built by the Washington-Virginia Railway to Camp A. A. Humphrey and will probably be ready for operation about Oct. 15.

McComb & Magnolia Railway & Light Company, McComb, Miss.—A report from the McComb & Magnolia Railway & Light Company, which is building a line to connect McComb, Magnolia and Summit, states that the construction of its line has been suspended for the period of the war. Guy M. Walker, New York, N. Y., president. [June 1, '18.]

Public Service Corporation, Newark, N. J.—Up to the present time the Public Service Corporation has received a total appropriation of $2,317,105 from the Government for extensions in the Public Service Railway Company system and electric transmission lines, as follows: new traction lines to Newark Bay, with eighteen additional cars, $821,739; extensions to traction lines at Camden and Gloucester City, including thirty-three cars, electrical extensions, etc., $1,240,780; electric construction and development work for the New York Shipbuilding Corporation at the recently established Yorkship Village, Gloucester City, $215,000, and new electric feeders and other work at Kearny—near Newark, $39,586.

Items under "Recent Incorporations," "Franchises," "Track and Roadway" and "Power Houses, Shops and Buildings" are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

Tidewater Power Company, Wilmington, N. C.—Plans are being made by the Tidewater Power Company to double-track its line to the shipyards, the Government to loan $400,000 for this and other work.

Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio.—Plans are being considered for the construction of a new bridge over Little Yellow Creek, at a point a few feet up the creek from the present structure. The bridge will be 41 ft. wide, 36 ft. to be used by the traction company and vehicle traffic and 5 ft. to be railed off as a sidewalk.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The city of Seattle, according to Mayor Hanson and Superintendent of Public Utilities Murphine, will seek a definite agreement with the Puget Sound Traction, Light & Power Company for the use of the new Fifteenth Avenue bridge into Ballard, before the company will be permitted to operate its cars over the structure. The question has become a live issue since the recent demand from the War Department for the immediate removal of the old bridge across the Salmon Bay Waterway at Fourteenth Avenue, Northwest, now used by the company. The Fourteenth Avenue bridge was built by the company on a permit from the War Department with the understanding that it should be removed when it became an obstruction, or when a permanent high bridge was built. The latter condition was realized when the city built the Fifteenth Avenue bridge. Unless the traction company comes to an agreement with the city, the removal of the old bridge will shut the company out of the thickly-populated Ballard district, except by a longer route over the Fremont bridge. The municipal cars now serve the Ballard district over the Fifteenth Avenue bridge, and according to Superintendent of Public Utilities Murphine could handle all the Ballard traffic.

Power Houses, Shops and Buildings

East St. Louis & Suburban Railway, East St. Louis, Ill.—A portion of the building containing the transformers at the Winstamely station of the East St. Louis & Suburban Railway Company was recently damaged by fire, caused by the explosion of an oil switch. Damage to the building is estimated at about $2,500, and the loss of the transformers is estimated at $20,000. New equipment will be purchased at once.

Boston & Worcester Street Railway, Boston, Mass.—The new general freight offices and freight depot of the Boston & Worcester Street Railway on Shrewsbury Street, Worcester, which have been under construction for the past few months, are now completed and the offices of the company have been moved to the new quarters.

Toledo Railways & Light Company, Toledo, Ohio.—A 12,500-kw. turbine at the Water Street plant of the Toledo Railways & Light Company was recently damaged by a short circuit. The loss is estimated at about $10,000.

Pennsylvania Railroad, Philadelphia, Pa.—Preparations are being made by the Pennsylvania Railroad for the construction of new shops, including engine house, machine-shop, car shop, etc., at Marietta.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—About $750,000 will be expended by the Charleston Consolidated Railway & Lighting Company for additional construction and machinery for its Charlotte Street electric plant to provide ample power and lighting for Government plants and private factories manufacturing war products. Of this amount $350,000 will be financed by the War Industries Board. The new machinery to be installed will include a 5,000-kw. turbo-generator, three 500-hp. boilers, condenser, switchboard, condenser intake, coal and ash handling equipment, etc. Specifications for the new construction include a brick chimney 250 ft. high by 12 ft. diameter at the top, and a 7,900-ft. transmission system Contracts have been awarded for the machinery.

Columbia Gas & Electric Company, Huntington, W. Va.—The Government has awarded a contract to the Columbia Gas & Electric Company for furnishing electric energy to the new Federal nitrate plant to be located at Broadwell, near Cincinnati, Ohio. The contract provides for an increase in capacity of the company's electric plant including a new 30,000-kw. turbo-generator, condensers, boilers and auxiliary equipment. It is understood that the Government has advanced the company $2,000,000 for the work.

Rolling Stock

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., is expecting delivery of a number of new passenger cars early in November.

Munical Bridge Commission, St. Louis, Mo., has purchased two one-man cars for use on the Free Bridge. Delivery is expected early in November.

Columbus Railway, Power & Light Company, Columbus, Ohio, has received nine new cars which will be put into service soon. They are combination summer and winter cars.

City of Tacoma, Wash., has arranged through the Director of Transportation and Housing of the United States Shipping Board for a loan of $237,000 to double-track the Tide Flats line and purchase ten additional cars.

City of Seattle, Wash., has arranged through A. Merritt Taylor, Director of Transportation and Housing of the United States Shipping Board, to borrow $392,000 for municipal railway improvements, among which will be included thirty-one cars. The title to the cars is to remain with the shipping board until the loan is repaid.

Auburn & Syracuse Electric Railway, Auburn, N. Y., is reported to have purchased a 350-ton electric locomotive, Westinghouse type, the first of its kind to be used by the company, to provide for increased service from the works of the Semet-Solvay Company, Split Rock plant, near Solvay. The locomotive will be used on the freight line of the company extending to Marcellus.

New Advertising Literature

Bonham Traffic Recorder Company, Hamilton, Ohio: Eight-page folder descriptive of the Bonham fare recorder.

Economy Electric Devices Company, Chicago, Ill.: Card entitled "Skip Stops Save Coal—Economy Meters Show the Saving."

Universal Safety Tread Company, Boston. Mass.—Circular on "Ladder Tread," designed primarily for ships, but suitable for electric cars, stations, etc.

Trade Notes

A. F. Nelson, Harrisburg, Pa., has purchased the rapid ready change carrier business from the estate of Charles F. Etter.

Boston (Mass.) Elevated Railway has closed a contract with the Bernitz Method Company, Boston, Mass., for the use of this company's method of furnace wall protection in connection with all of its underfeed stoker installations.

Economy Electric Devices Company, Chicago, Ill., announces that an order has been received from the Capital Traction Company, Washington, D. C., for ten Economy electric railway meters suitable for the measurement of energy consumption on the cars of the Capitol City. The company has also recently sold the Chicago & West Towns Railway Economy railway meters for use in power-saving work on all of the cars of this property, which serves a dense suburban territory west of Chicago.

Bolden Manufacturing Company, Chicago, Ill., in order to overcome delays of l.c.l. freight deliveries from Chicago to Eastern customers and to meet the government's restrictions on l. c. l. shipments, has opened a warehouse and distributing station at Metuchen, N. J. This warehouse is in charge of S. C. Schenck, Eastern manager of the company, and a small emergency stock of all insulations and sizes of magnet wire will be carried for immediate or urgent shipment. Shipments from this stock will be billed f.o.b. Metuchen at an advance of ¾ cents a pound over the Chicago price. It is also the intention of the company, so far as possible, to pack shipments from Chicago for Eastern customers in its cars from Chicago to Metuchen, to be reshipped from there. The freight will be prepaid through to destination and an additional charge made on the invoice equivalent to the l.c.l. rate from Chicago to destination. However, if shipments are desired direct from Chicago, they will be made on request. All orders to the company from Eastern customers for magnet wire should be mailed to the Belden Manufacturing Company, Metuchen, N. J.

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'Twas the Calgary Municipal Railway which was the first to prove that a city of more than 65,000 people can be operated exclusively with one-man cars.

Calgary's double-truck cars have air brakes and Peacocks.

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If you, too, want to conserve man-power, give service and make a little money besides, let us help you select a Peacock Brake that will make good on *your* forthcoming one-man cars whether they are new or rebuilt.

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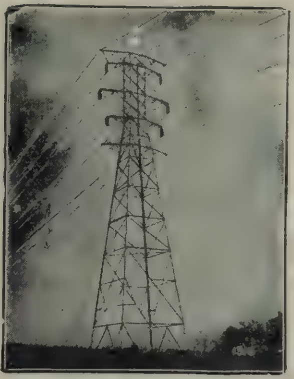
Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS



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U. S. Steel Products Co. Pacific Coast Dept.
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Any and all kinds of metallic and carbon welding made easy.

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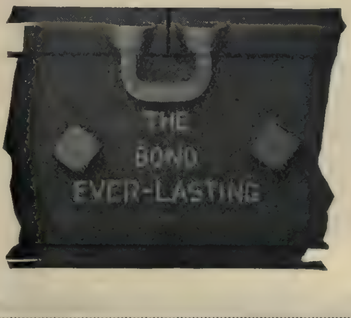

This is the bond that when welded to your rail joint shows a saving of 25-35 cents per bond. We prove this saving over any other method.

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Columbia-Made Forgings

are

Safest

Columbia-made Drawbar Links

If you could compare your metal-working facilities with ours, you would see one reason why so many railways—large and small—are our permanent customers.

Brake rigging forgings in particular must, above all, possess the quality of SAFETY.

That quality is assured by means of specialized Columbia equipment operated by Columbia specialists.

We have the facilities not only to give you quality, but just prices and prompt delivery, too.

Columbia Machine Works & Malleable Iron Co.

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TOOLS

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

V-K

V-K Oilless Trolley Wheel

Non-Arcing Trolley Harp

From the Standpoint of Performance

V-K equipment is second to none

The V-K Oilless Trolley Wheel and Non-Arcing Harp have proven superior to any other type because they are developed mechanically and practically beyond anything of the kind yet made. While the harp can be used with any type of wheel, the most efficient and economical service is obtained by using both the V-K Oilless wheel and harp in combination.

The wheel is of the latest improved type; made of pure new metal, tough, not hard—is self-lubricating, properly balanced, and of the highest conductivity.

It will not run hot or burn out, and being free from oil or grease, there is no resistance to the flow of current.

The *harp* has a patented gripping device which prevents loose axle pins, permitting the current to pass directly through the shaft, the best and most saving way. It eliminates arcing, and insures an uninterrupted flow of energy.

The V-K Trolley Harps and Wheels will provide maximum service, with a saving in power and maintenance that will more than pay the cost of their installation.

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Further information and
prices on application

Columbia-Made Forgings

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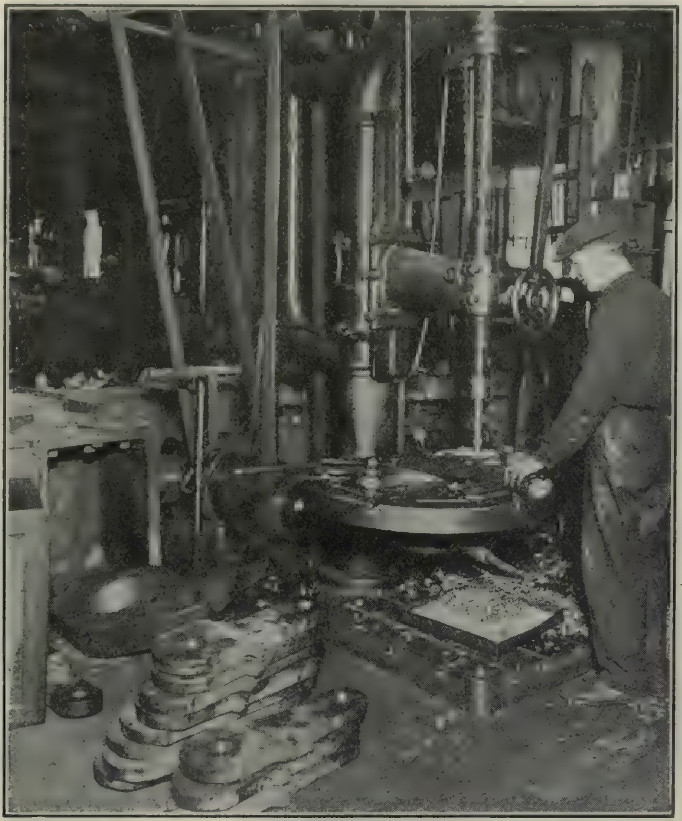

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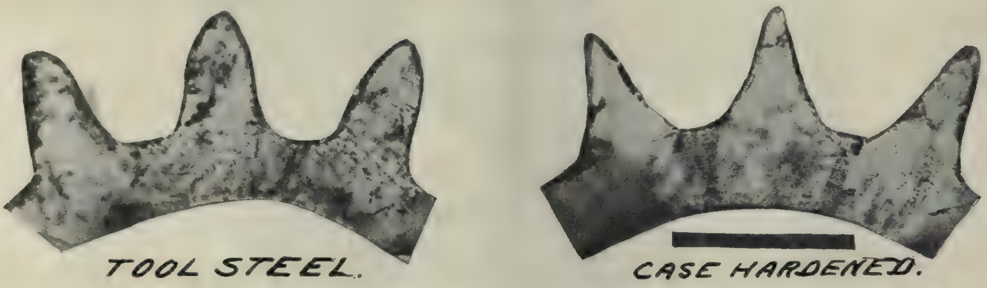
Further information and prices on application

Keeping Records Up to Date

(A test on an imitation pinion of the 1917 Class.)

The following shows a record of test on "Tool Steel" vs. a widely advertised pinion hardened by a case-hardening process—claimed to be "as good as Tool Steel"—selling for about the same price.



"Tool Steel" Pinion on Motor No. 1

Imitation Pinion on Motor No. 2

Same Car, Same Mileage, both started with new soft gears.

Ratio of Wear, 1 to 2.7 Favor "Tool Steel"

also

The imitation pinion caused its gear to wear considerably faster than the gear mated with "Tool Steel."

Have You Made Comparative Tests for Quality?

If you have, it's dollars to doughnuts you've standardized on our gears.

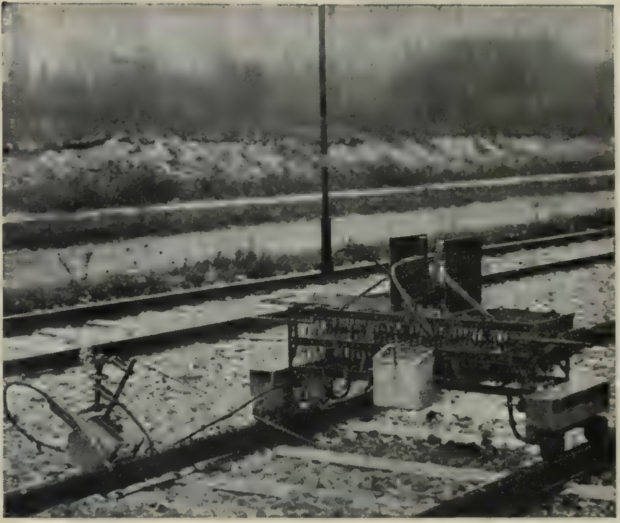
THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI, OHIO

Welding 2 Rail Bonds Every 5 Minutes

That is what good operators are doing with

ERICO

Portable Welders



which weigh only 65 pounds and with the Rheostat, weight 140 pounds, can easily be moved and handled by two men.

Erico outfits represent a small investment, but bring large returns in saved time and labor.

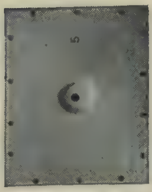
The Rheostat can also find many uses in your shop for arc welding, and on account of its portability can be brought to the work.

Write for full information.

The Electric Railway Improvement Co.

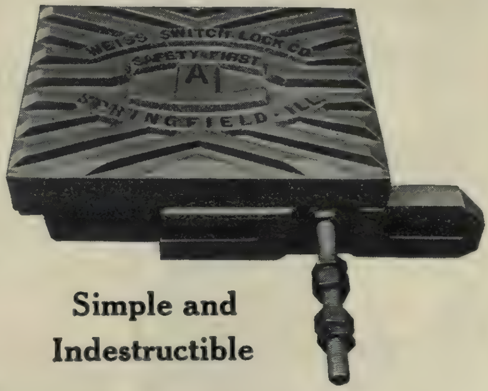
Cleveland, Ohio

WEISS SWITCH LOCK



Ends All Switch Troubles

Here is a positive railway switch point lock that locks both right and left, locking the switch so tightly that there is no chance of splitting it. Once installed it absolutely ends all switch troubles, for it is *waterproof, non-freezable, mudproof and sandproof.* It never requires attention, it is safe, dependable and practically indestructible.



Simple and Indestructible

This switch lock is exceedingly simple in design, having very few parts, none of which are complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through, to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

Watertight
Non-Freezable
Mud-Proof
Sand-Proof

WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.

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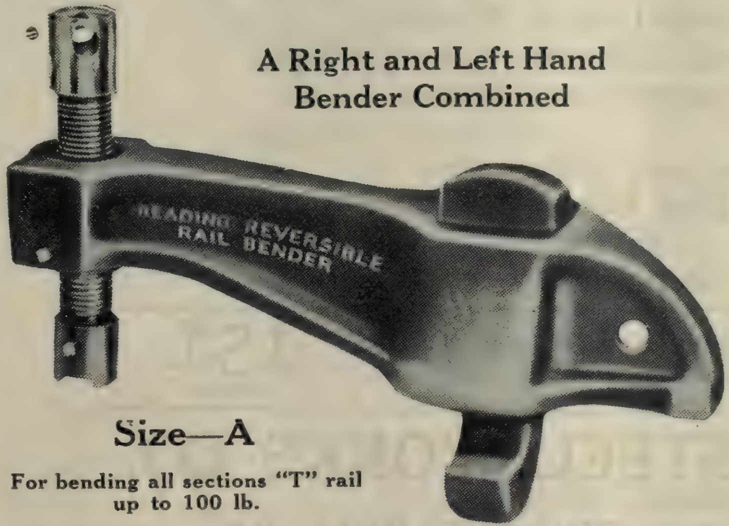
the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell It Before Depreciation Scraps It

The Searchlight Section is helping others—
Let it help you also

The Reading Reversible Rail Bender



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Size—A

For bending all sections "T" rail up to 100 lb.

It has a greater working radius than any other Rail Bender on the market. It will bend a Rail nine inches from the end, either right or left without adding another section of Rail and Splice Bar.

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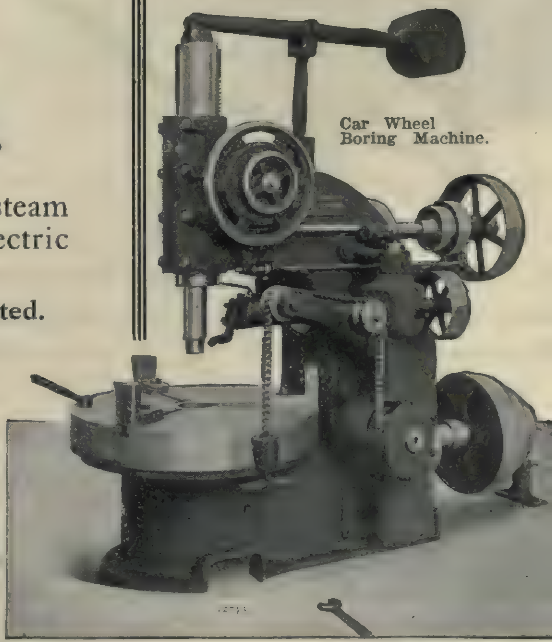

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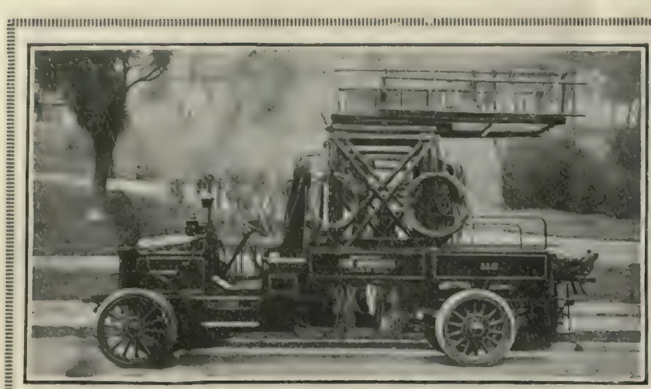

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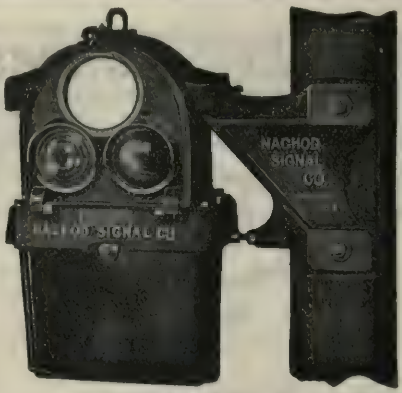

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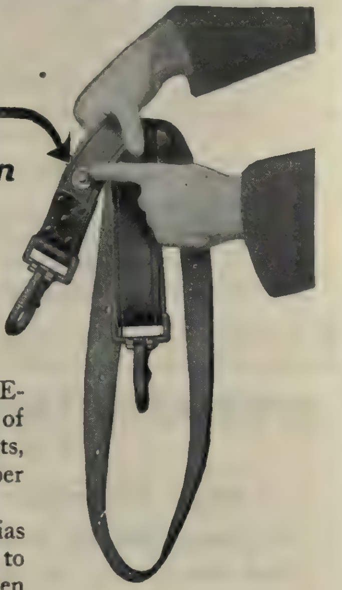

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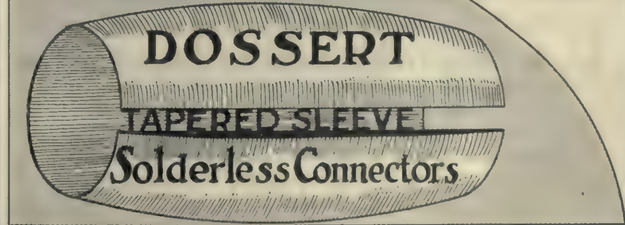

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INSULATING TAPE of Quality

STANDARD
Woven Fabric Co
Walpole, Mass.

International Specialties Cover the Entire Range of Fare Collection

Money-counting fare boxes; Coin and metal ticket-counting fare boxes; Coin registers; Coin and transfer registers; Coin, metal ticket and transfer registers; Motor-driven coin and transfer registers; Motor-driven registers for station, ferry, park and terminal use; Metal and paper registers with single hopper; Round and square registers; Transfer printers; Heeren Enamelled Badges; Punches and Bell Cord.

The International Register Company
15 South Throop Street, Chicago

You will buy
CLEVELAND
Fare Boxes
Eventually—
Why not now?

Cleveland Fare Box Co.
CLEVELAND, OHIO

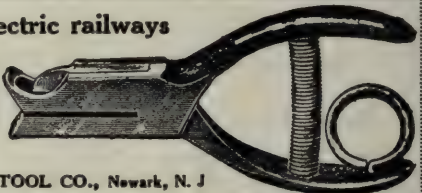
SERVICE
SAFETY
and
ACCURACY

Insured through use of "KANT-SLIP" Interurban Train Dispatcher Register Systems

Write for booklet

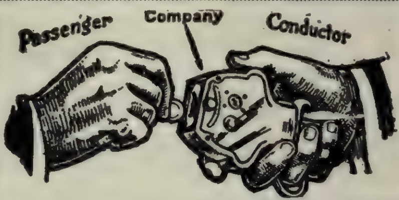
The
STANDARD REGISTER COMPANY
DAYTON, OHIO

Consolidated High Grade Products
Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.
CONSOLIDATED CAR HEATING CO., Albany New York



75% of the electric railways
use
B-V Punches
Send for catalog
BONNEY-VEHSLAGE TOOL CO., Newark, N. J

Heating and Ventilating
Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.
The Cooper Heater Company
Carlisle, Pa.



Direct
Automatic
Registration
By the
Passenger
Rooke Automatic
Register Co.
Providence, R. I.

Bonham Traffic Recorders
Show origin and destination of every fare collected as well as other valuable traffic data.
The Bonham Recorder Co., Hamilton, O.

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
30 Church Street, New York City

UNIVERSAL ANTI-SLIP TREADS
cars and station steps.
Universal Safety Tread Company
Waltham, Mass.

The Big Three
D & W Fuses, Deltabeston Wire
D & W Oil Fuse Cutouts
D & W Fuse Co., Providence, R. I.

The subscription was discontinued because a "Want" advertisement brought results

Editor—"We are sorry to lose your subscription, Mr. Jackson. What's the matter? Don't you like our politics?"

Mistah Jackson—"'Tain't dat, sah; 'tain't dat. Mah wife jes' been an' dun landed a job o' wuk for me by advertisin' in youh darned ole papah."

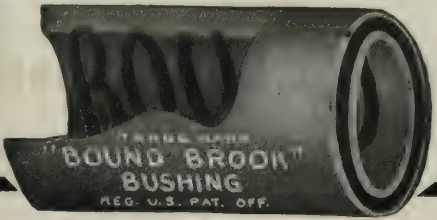
If you're looking for a "job o' wuk"—

If you're looking for a competent man who will be able to handle a big or a little "job o' wuk" and want RESULTS—

—there is no more efficient or economical method of securing either than the insertion of a card in the

SEARCHLIGHT
SECTION

32



No Inspection Needed

One of your big charges is equipment inspection. Cut it down by using Bound Brook Oil-less Bearings. Perfect lubrication assured for the life of the bearing and we make them so carefully that that is a long time.

Made at Bound Brook, N. J., by the
Bound Brook Oil-less Bearing Co.
Formerly Graphite Lubricating Company

FUEL CONSERVATION

is a necessity and the heating and ventilating of street cars should be accomplished the most economical way. Our Hot Air Forced Ventilation Equipment combines heat with ventilation at a saving of 50% to 70% over electric heat.

THE PETER SMITH HEATER CO. DETROIT, MICH.

THE HOLLAND LINE
of Railway Supplies

Trolley Wheels
Trolley Harps
Trolley Poles
Trolley Bases
Friction Tape
Splicing Compound
Silk and Linen
Tape—Armature
Tapes and Twine
Fibre in all shapes and sizes.

Our line of trolley accessories will meet your requirements.

When you need anything write to

The Holland Trolley Supply Co.
1623 E. 43d St., Cleveland, O.

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

PROVIDENCE FENDERS H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Manufacturers of The Providence Fender and H-B Life Guards

Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents.

N-L INDICATING TAILLIGHTS
HELP CARS MAKE BETTER TIME

Colored lights are notification to those following of the movement of the car's controller. Helps avoid rear-end accidents; avoids delays of cars behind. Used on leading railways.

THE NICHOLS-LINTERN CO.
Cleveland, Ohio, U. S. A.

Samson Bell and Register Cord

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

SAMSON CORDAGE WORKS, BOSTON, MASS. 2

MASON SAFETY TREAD—lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.
KARBOLITH CAR FLOORING—for steel cars; is sanitary, light weight, fire proof, non-slippery.
STANWOOD STEPS—Self-cleaning, non-slippery, light.
Our products used on all leading railroads, on cars and stations. For details address:
AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.
Branch Offices: Boston, New York City, Philadelphia.
Agencies in all principal cities.

SEARCHLIGHT SECTION

Rotary Converters

60 Cycle, 550/600 Volts

2—100-kw. General Electric, 3-phase, 60-cycle, 600 volts D.C., with three OI SC single-phase transformers, 13,200 volts; also A.C. and D.C. panels.

1—400-kw. General Electric, 6-phase, 25-cycle, type HC, Form P, 600 volts D.C., 430 volts A.C., 900 r.p.m.

25 Cycle, 550/600 Volts

2—500-kw. General Electric, 3-phase, 25-cycle, Type HC, Form K, 600 volts D.C., 750 r.p.m. With each rotary there are suitable switchboard panels and three 165-kva. Gen. Elec. OI SC Type HR transformers, 6600/5940 volts prim., 430/286/143 volts sec.

1—300-kw. National, 3-phase, 25-cycle, Type RT, 550 volts D.C., 330 volts A.C., 500 r.p.m.

1—250-kw. General Electric, 3-phase, 25-cycle, Type TC, Form A, 550 volts D.C., 350 volts A.C., 750 r.p.m.

MacGOVERN & COMPANY, Inc.

114 Liberty Street New York, N. Y.

ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.

3—300-kw. General Electric, 3-ph., 60-cy., 600-v., 1200 r.p.m. Rotary Converters with transformers.

TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

ARCHER & BALDWIN, Inc.
114-118 Liberty St., New York, N.Y. Telephone 4337-4338 Rector

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FOR SALE

Five (5) NEW Double

TRUCK CARS

Length 45 ft. 0 in. Equipped with 4 G. E. Co.'s 247 Motors and G.E. Co.'s Air Brakes. For delivery October 15th, 1918.

Two (2) Double

TRUCK CARS

Lengh 44 ft. 6 in. Equipped with 4 G. E. Co.'s 203 Motors and Air Brakes. Immediate Delivery.

McGuire-Cummings Manufacturing Co.
Cars and Trucks—Snow Sweepers
Electric Locomotives
111 West Monroe Street, Chicago

FOR SALE

Immediately Delivery

7000 New Machine Bolts, 1⅛-in. x 5-in. Square head, hexagon Nut, machine turned, intended for rail joints. Full specifications on request.

Following Second Hand Equipment

1—Foster Super Heater, Patent Nov. 17, 1903, No. 744323; pounds of steam per hour, 500. Steam pressure 40 lb. Degrees super-heat, 64. Final steam pressure, 350.

2—General Electric Motors. Type MP, Class 6-200-150, 500 volts. 360 amperage. 150 r.p.m.

50—B-23 Controllers.

12—Westinghouse 38-B Motors, complete, 500 volts.

12—Westinghouse 38-B Armatures, only.

2—Brill 39-E Maximum Traction Trucks.

Offered subject to prior sale.

Receivers PITTSBURGH RAILWAYS CO.
B. J. Yungbluth, General Storekeeper,
PITTSBURGH, PENNA.

RATES:

1 inch—$3.00
4 inches— 2.90 an inch

(The above rate applies to a 4-inch space in one issue, a 2-inch space in two issues, or a 1-inch space in four issues. The larger spaces following may be used up in a similar way.)

8 inches—$2.80 an inch
15 inches— 2.70 an inch
27 inches— 2.60 an inch
50 inches— 2.55 an inch

Rates for larger spaces furnished on application.

STREET CARS

3—32 ft. Closed

Complete with equipment. *First-Class.* Could be converted to one-man type.

4—9 Bench Open Trailers

Immediate Shipment.

Send for new Bulletin No. 247 for other bargains. What have you FOR SALE?

ZELNICKER IN ST. LOUIS

Rails, Power Plant Equipment, Machinery, etc.

FOR SALE

All or any part of 170,750 pounds 7-strand 1/0 bare copper

CABLE

new and on original reels.

Subject to prior sale.

The Northern Ohio Traction & Light Co.
Akron, Ohio

OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full Particulars to

ELECTRIC EQUIPMENT Co.
601 Commonwealth. Bldg. Phila. Pa.

:5 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to lengths for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

FOR SALE

2 General Electric, 500-Kw., Rotary Converters

Type HC, 25 cycle, 375 r.p.m., 250 volts, complete with General Electric Type ABH air blast transformers with blowers and motors, 2 General Electric Type IRH Potential regulators and Blue Vermont Marble Switchboard, consisting of 2 High Tension panels, 2 machine panels, and 4 feeder panels for 3-wire distribution. All equipment in excellent condition and ready for immediate delivery. Equipment can be seen running.

THE KANSAS CITY RAILWAYS CO.
1500 Grand Ave., Kansas City, Mo.

FOR SALE

Equally as good as new, approximately fourteen miles 2/0 bare grooved

TROLLEY WIRE

and four miles 4/0 in long lengths, second-hand, but in first-class condition.

HENRY A. HITNER'S SONS CO.
Station "K," Philadelphia, Pa.

FOR SALE

6—Type WH 12-A Motors and Fields, complete.
4—Type WH 38-B Motors and Fields, complete.
4—Brill 21-E Trucks, 7-ft. wheel base.
[illegible]—Type K-10 Controllers.
1—23-ft. Line Car Body.
[illegible]—18-ft. Passenger Car Bodies.
4—Type WH 12-A new Gear Pans. Gear Ratio, 20-62.

PUBLIC UTILITIES CO.
Evansville, Indiana

FIRST Get Bulletin 237—or, Wire

ZELNICKER IN ST. LOUIS

Before buying or selling

RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.
What have you for sale?

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60 Tons

7-in Girder Rails

P. S. Co. Section No. 238

HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

AIR COMPRESSOR

Sullivan Straight Line Steam Driven, 2-Stage, Class WB-2

Capacity, 1160 cu.ft.
Diameter, steam cylinder, 20 in.
Diameter, L.P. air cylinder, 22 in.
Diameter, HP. air cylinder, 14 in.
Stroke, 24 in.
Total weight, 33,500 pounds.
Price, $1500.00.

Thoroughly Overhauled and Ready for Immediate Shipment.

MISSISSIPPI RIVER POWER CO.
Keokuk, Ia.

FOR SALE

Copper Feed Wire

MAKE US AN OFFER

Approximately 20 miles 500000CM and 4 miles 350000CM triple and double weatherproof stranded cable now being removed. Insulation and wire in good condition for reinstallation.

THE RHODE ISLAND CO.
Providence, R. I.
W. C. Slade, Supt. of Power and Lines.

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS

—LET IT HELP YOU ALSO.

WANTED

ACCOUNTING CLERK

One who is experienced in classifications and bookkeeping of traction and lighting corporations. State experience, references and salary expected. Man exempt from draft preferred.

P246—Elec. Ry. Journal
Leader-News Bldg., Cleveland, Ohio

POSITIONS VACANT

NIGHT car barn foreman wanted, and si general repair men. Address Little Roc Railway & Electric Company, 115 Wes 4th Street, Little Rock, Arkansas.

ASSISTANT SUPERINTENDENT wante by street railway in southwestern city o twenty thousand, operating twelve cars Excellent opportunity for energetic man P-239, Elec. Ry. Journal, Chicago.

ARMATURE winder wanted; first-class good pay; well heated shop; good work ing conditions. Apply Beaver Valle Traction Co., New Brighton, Pa.

ENERGETIC superintendent of transporta tion wanted for city of 50,000 Sout East. Applicant must have proven abil ity to handle men and obtain results Give in first letter experience, national ity, age, weight, references, salary ex pected, relation to military service, an supply small photo. Address P-241, Elec Ry Journal, Porto Rico.

SUPERINTENDENT of rolling stoc wanted; expert in handling labor, able t obtain efficient and economical results i car maintenance and operation. Stat fully past experience, age, whether sub ject to draft, nationality, salary and sup ply kodak picture. Address P-240, Elec Ry Journal, Porto Rico.

TWO good night barn foremen by mediun sized interurban and local railway com pany in Ohio. P-243, Elec. Ry. Journal Ohio.

TRAINMASTER wanted. Must be a ma of tact, capable of handling men an maintaining discipline without creatin discord. City and suburban service Possibilities of advancement. P-24 Elec. Ry. Journal, Conn.

POSITIONS WANTED

A STRICTLY high grade young operatin executive, now employed, with a broa experience in the management of opera tion of electric light, power, water, gas city and interurban railway properties including operation of extensive transmis sion systems, in centers of population o sixty-five thousand and less, will con sider new connections in charge of opera tion of the above class properties, eithe individual, combined or group; or wil consider a connection as assistant to a executive handling larger operations A practical operating man; now employed, desires new connections only t broaden field of work; an organizer; handler of men; long on policy; at home in the management of any phase of operation or construction in connection with above class of utilities, and can get results. Married; 33 years of age; ca change connections in thirty days; present salary, forty-eight hundred dollars Will call for personal interview if proposition appears attractive. PW-245, Elec Railway Journal, Chicago.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car.
Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers
Railway Improvement Co.

Automobiles and Busses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry.
Johns-Manville Co., H. W.
Nichols-Lintern Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side.
Holden & White, Inc.

Bearings, Oilless, Graphite, Bronze and Wood.
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.

Bells and Gongs.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Reading Specialties Co
Zelnicker, Walter A., Supply Co., Inc.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Tubes.
National Tube Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges and Buildings.
American Bridge Co.

Brooms, Track, Steel or Rattan.
Zelnicker, Walter A., Supply Co., Inc.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Bunkers, Coal.
American Bridge Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden.
Bound Brook Oil-less Bearing Co.

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Coasting Recorders
Railway Improvement Co.

Castings, Brass, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car.—(See Head Lining.)

Circuit Breakers.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Dossert & Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track.—(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cameron Electrical Mfg Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conduits, Underground.
Johns-Manville Co., H. W.

Connectors, Solderless.
Dossert & Co.
Westinghouse Elec. & Mfg. Co

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery.
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

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BUY W.S.S.

Model 341

A. C. and D. C. Voltmeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter, and Model 370 A. C. and D. C. Ammeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

Only when you have studied it by direct comparisons will you realize fully what a high degree of efficiency and economy you can effect by selecting

Weston

Indicating Instruments

As soon as you inspect them—even before you subject them to the test of comparisons in actual use—the reasons for their acknowledged superiority will be apparent to you. These reasons are revealed in every structural detail.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

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Philadelphia
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B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; E. D. Hillman, Secretary and Engineer; Harold A. Hegeman, Vice-President and Treasurer; Fred C. Dunham, Assistant to President.

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50 East 42d St., NEW YORK CITY
Hegeman-Castle Corporation, Chicago
National Railway Appliance Co., Washington, D. C.

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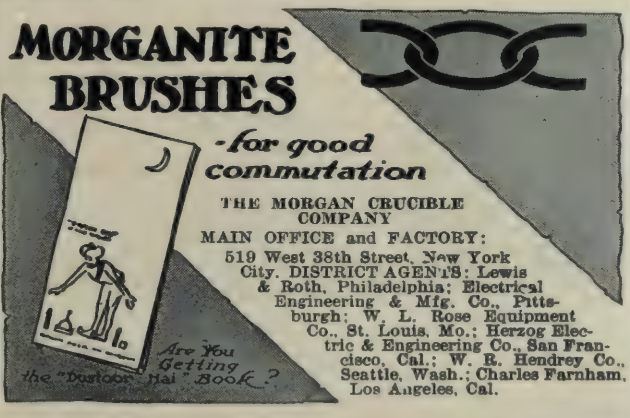
Tool Steel Gears and Pinions, Johnson Fare Boxes, Perry Side Bearings, Hartman Centering Center Plates, Wasson Trolley Bases, Garland Ventilators, Electric Arc Welders, High Class Railway Varnishes and Enamels, Anderson Slack Adjusters, Clapp Fire Resisting Paint, Genesco Paint Oil, Kelly Brake Jaw, Linofelt, Fibrofelt, Lith.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Imperial Brass Mfg. Co.
Milburn Co., The Alex.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service.
Wish Service, P. Edward.

Doors, Asbestos.
Johns-Manville Co., H. W.

Door Operating Devices.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

Doors and Door Fixtures.
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

Doors, Folding Vestibule.
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers.)

Drills, Track.
American Steel & Wire Co
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker, Walter A., Supply Co., Inc.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Beeler, John A.
Drum & Co., A. L.
Ford, Bacon & Davis.
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter.
Scofield Engineering Co.
Sloan, Huddle, Feustel & Freeman
Stone & Webster.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

Engines, Gas and Oil.
Westinghouse Elec. & Mfg. Co.

Engines, Steam.
Westinghouse Elec. & Mfg. Co

Fare Boxes.
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
National Railway Appliance Co.

Fences, Woven Wire and Fence Posts.
American Steel & Wire Co.
Page Steel & Wire Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co
Electric Service Supplies Co.
Star Brass Works.

Fibre and Fibre Tubing.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Coils (See Coils.)

Filters, Water.
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus.
Johns-Manville Co., H. W.

Fire-Proofing Material.
Johns-Manville Co., H. W.

Floodlights.
Electric Service Supplies Co.

Flooring Composition.
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

Forgings.
Eureka Co.
Standard Steel Works Co.

Frogs, Truck. (See Track Work.)

Furnaces. (See Stokers.)

Fuses and Fuse Boxes.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co

Fuses, Refillable.
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets.
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co

Gas Producers.
Westinghouse Elec. & Mfg. Co.

Gates, Car.
Brill Co., The J. G.

Gages, Oil and Water.
Ohio Brass Co.

Gear Blanks.
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Railway Appliance Co
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric.
General Electric Co.

Generators.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs.)

Graphite.
Morgan Crucible Co.

Greases. (See Lubricants.)

Grinders and Grinding Supplies.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle.
American Bridge Co.

Guards, Trolley.
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Holland Trolley Supply Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric.)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water.
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove.)
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists and Lifts.
Columbia M. W. & M. I. Co
Duff Mfg. Co.
Ford Chain Block & Mfg. Co
Niles-Bement-Pond Co.

Hose, Bridges.
Ohio Brass Co.

Hose, Pneumatic and Fire.
Johns-Manville Co., H. W.
Westinghouse Traction Brake Co

Hydraulic Machinery.
Niles-Bement-Pond Co.

Inspection.
Electrical Testing Lab's.

Instruments, Measuring, Testing and Recording.
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Paper and Tape.
Freydberg Bros.
General Electric Co.
Irvington Varnish & Ins. Co.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints.)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material.)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins.
Electric Service Supplies Co.
Hubbard & Co.

Jacks. (See also Cranes, Hoists and Lifts.)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

Joints, Rail.
Carnegie Steel Co.
Reading Specialties Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes.
Bemis Car Truck Co.
Brill Co., The J. G.

Junction Boxes.
Johns-Manville Co., H. W
Standard Underground Cable Co.

Laboratory.
Electrical Testing Lab's.

Lamp Guards and Fixtures.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent. (See also Headlights.)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co

Lamps, Signal and Marker.
Nichols-Lintern Co.
Ohio Brass Co.

Lathes, Car Wheel.
Niles-Bement-Pond Co.

Lighting Regulators, Car.
Holden & White, Inc.

Lightning Protection.
Anderson M. Co., A. & J. M
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Lights, Portable Carbide.
Milburn Co., The Alex.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M
Columbia M. W. & M. I. Co.
Dossert & Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locomotives, Electric.
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co
Westinghouse Elec. & M. Co.

Lubricating Engineers.
Galena-Signal Oil Co.

Lubricants, Oil and Grease.
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, etc.)

Machine Tools.
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work.
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Mats.
Johns-Manville Co., H. W.

Meters, Car, Watt-Hour.
Economy Electric Devices Co

Meters. (See Instruments.)
Electric Service Supplies Co.
Wood Co., Chas N.

Mica.
Schoonmaker, A. O.

Mirrors for Motormen.
Drew Elec. & Mfg. Co.

Motors, Electric.
Westinghouse Elec. & M. Co.

Motor Generation, Bonding and Welding.
Lincoln Bonding Co.

Motor Leads.
Dossert & Co.

Nuts and Bolts.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Oils. (See Lubricants.)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Packing.
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Packing Rings.
Johns-Manville Co., H. W.

Paints and Varnishes. (Insulating.)
Irvington Varnish & Ins. Co.
Mitchell-Rand Mfg. Co

Paints and Varnishes. (Preservative.)
Johns-Manville Co., H. W.

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National Ry. Appliance Co.

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Reduce the labor required—
Reduce track settlement—
Reduce the time of traffic interruption.

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- Perry-Hartman Center Plates and Side Bearings.
- Watson Car Lighting Regulator.
- Anderson Brake Slack Adjusters.
- Reliance Air Sanders. Air Rectifier.

Chicago District Representatives for:
- Drew Line Material.
- Columbia Car & Shop Equipment.
- Reciprocating Track Grinder.
- Lincoln Rail Bonding and Bonds.
- Atlantic Equipments for Joint Welding

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Do you know or can you learn its manufacturing history?

Every Nuttall Gear has stamped on it a serial number unde which is recorded all details of manufacture and the result of final tests.

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R. D. NUTTALL CO., Pittsburgh, Pa.

Nuttall Gears
EVERY GEAR REGISTERED

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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KALAMAZOO, MICH., U. S. A.

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Ohio Brass Co.

Pinion Pullers.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears.)

Pins, Case Hardened, Wood and Iron.
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe.
National Tube Co.

Pipe Fittings.
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers. (See Machine Tools.)

Pliers, Insulated
Electric Service Supplies Co.
National Railway Appliance Co.

Pole Reinforcing.
Hubbard & Co.

Pole Sleeves.
Drew Elec. & Mfg. Co.

Poles and Ties, Treated.
Lindsley Bros. Co.

Poles, Metal Street.
Bates Expanded Steel Truss Co.
Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber.
Carney & Co., B. J.
Lindsley Bros. Co.
Northern White Cedar Ass'n.
White Marble Lime Co.

Poles, Trolley.
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holland Trolley Supply Co.
National Tube Co.
Nuttall Co., R. D.

oles, Tubular Steel.
National Tube Co.

ower Saving Devices.
Arthur Power-Saving Recorder Co.
Economy Electric Devices Co.
Railway Improvement Co.

ressure Regulators.
General Electric Co.
Ohio Brass Co.
Westinghouse Electric & Mfg. Co.

unches, Ticket.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

urifiers, Feed Water
Scaife & Sons Co., Wm. B.

all Grinders. (See Grinders.)

all Welding. (See Brazing and Welding Processes.)

ails, Relaying.
Zelnicker, Walter A., Supply Co., Inc.

attan.
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

ecorders, Power Saving.
Arthur Power-Saving Recorder Co.

Registers and Fittings.
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.
Standard Register Co.

Reinforcement, Concrete.
American Steel & Wire Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines.)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils.)
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Replacers, Car.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

Resistance, Grid.
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube.
General Electric Co.
Westinghouse Elec. & M. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)

Rheostats.
General Electric Co.
Westinghouse Elec. & M. Co.

Roofing, Building.
Johns-Manville Co., H. W.

Roofing, Car.
Johns-Manville Co., H. W.
Pantasote Co.

Sanders, Track.
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car.
Brill Co., The J. G.

Sash Metal, Car Window.
Hale & Kilburn Corp.

Scrapers, Track. (See Cleaners and Scrapers, Track.)

Seats, Car.
Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

Second-Hand Equipment.
(See Searchlight Section)
Archer & Baldwin.
MacGovern & Co., Inc.

Shades, Vestibule.
Brill Co., The J. G.

Shovels.
Hubbard & Co.

Signal Systems, Block.
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signals, Car Marker
Nichols-Lintern Co.

Signals, Car Starting.
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co.

Signal Systems, Highway Crossing.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters.
(See Brake Adjusters.)

Sleet Wheels and Cutters.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus. (See Welding, Processes and Apparatus.)

Speed, Indicators.
Johns-Manville Co., H. W.

Spikes.
American Steel & Wire Co.

Splicing Compounds
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors.)

Springs, Car & Truck.
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Sprinklers, Track & Road.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car.
American Mason Safety Tread Co.
Universal Safety Tread Co.

Stokers, Mechanical.
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

Storage Batteries. (See Batteries, Storage.)

Strand
Roebling Son's Co., J. A.

Straps, Car, Sanitary.
Holden & White, Inc.
Railway Improvement Co.

Structural Iron. (See Bridges.)

Superheaters.
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)

Switches, Lock.
Weiss Switch Lock Co.

Switch Stands.
Ramapo Iron Works.

Switches, Track. (See Track Special Work.)

Switches & Switchboards.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Westinghouse Elec. & M. Co.

Tampers, Tie.
Ingersoll-Rand Co.

Tanks, Oil Storage.
Milwaukee Tank Works.

Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)

Telephones and Parts.
Electric Service Supplies Co.

Terminals, Cable.
Standard Underground Cable Co.

Testing Commercial & Electrical.
Elec'l Testing Laboratories.

Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

Ticket Choppers & Destroyers.
Electric Service Supplies Co.

Ties, Mechanical.
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel.
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties, Posts,, etc.)

Tools, Track & Miscellaneous.
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Klein & Sons, Mathias.
Railway Track-work Co.

Torches, Acetylene. (See Cutting Apparatus.)

Towers & Transmission Structures.
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co
Westinghouse Elec. & M. Co.

Tower Wagons & Auto Trucks.
McCardell & Co., J. R

Track, Special Work.
Barbour-Stockwell Co.
Cleveland Frog & Cross. Co.
Columbia M. W. & M. I. Co.
Ramapo Iron Works.
St. Louis Frog & Switch Co.

Transfers. (See Tickets.)

Transfer Tables.
American Bridge Co.
Archbold-Brady Co.

Transformers.
General Electric Co.
Westinghouse Elec. & M. Co.

Treads, Safety, Stairs, Car Steps.
American Mason Safety Tread Co.
Universal Safety Tread Co.

Trolley Bases.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Holland Trolley Supply Co.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving.
Holden & White, Inc.

Trolleys & Trolley Systems.
Ford Chain Block & Mfg. Co.

Trolley Shoes.
Holden & White, Inc.

Trolley Wheels. (See Wheels, Trolley.)

Trolley Wire
Roebling Son's Co., John A.

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The same attention to detail, operating from a central control, is found here as elsewhere in Collier Service cities.

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Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

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Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel.
National Tube Co.

Turbines, Steam.
General Electric Co.
Westinghouse Elec. & M. Co.

Turnstiles.
Perey Mfg. Co., Inc.

Valves.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Varnishes. (See Paints, etc.)

Ventilators, Car.
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Voltmeters. (See Instruments.)

Washers.
Bound Brook Oil-less Bearing Co.

Waste, Saturation System.
Milwaukee Tank Works.

Water Softening and Purifying Systems.
Scaife & Sons Co., Wm. B.

Welders, Portable Electric.
Electric Ry. Improvement Co.

Welding Processes and Apparatus.
Electric Ry. Improvement Co.
General Electric Co.
Imperial Brass Mfg. Co.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.

Wheel Guards. (See Fenders & Wheel Guards.

Wheel Presses. (See Machine Tools.)

Wheels, Car, Cast Iron.
Bemis Car Truck Co.

Wheels, Car, Steel and Steel Tired.
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley.
Anderson Mfg. Co., A. & J. M.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Holland Trolley Supply Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Whistles, Air.
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co

Wire Rope.
American Steel & Wire Co.
Roebling's Sons Co., John A.

Wires and Cables.
Aluminum Co. of America.
American Elec'l Works
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Roebling's Sons Co., John A.
Standard Underground Cable Co.
Westinghouse Elec. & M. Co.

Wood Preservatives.
Lindsley Bros. Co.

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CARBON FERRO TITANIUM REG. U.S. PAT. OFFICE TRADE MARK F.C.T.

Since 1910 the Los Angeles railway has bought 19,000 tons of Titanium-treated rail.

Most of this rail was for 116-lb. heavy service section. Now it specifies Titanium treatment exclusively.

Specify Titanium-Treated Rails

FOR PUBLIC APPROBATION

Every time you have to tear up a street for rail renewal you disturb the business and comfort of hundreds of merchants and thousands of passengers and pedestrians.

Whether you can help this or not, you know these upheavals are a disturbing factor in that vital though intangible thing called Public Relations.

To cut such disturbances in half hereafter it is surely worth while to specify Titanium-Treated Rail.

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

Processes and Products Patented

General Office and Works:
Niagara Falls, N. Y.

FERRO CARBON REG. U.S. PAT. OFFICE TRADE MARK F.C.T. TITANIUM

Pittsburgh Office: Oliver Building
Chicago Office: People's Gas Building

New York Office: 165 Broadway

Power Saving at Tampa

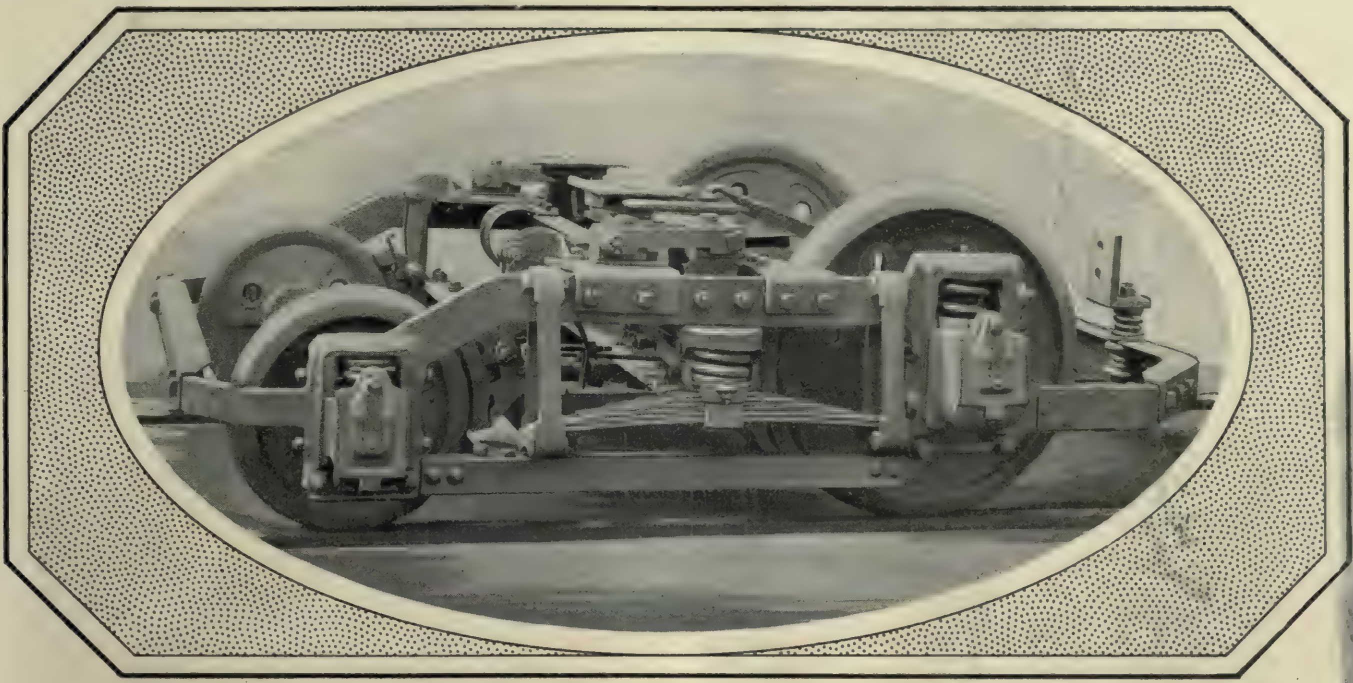
Fifteen safety cars equipped with ball bearing motors and journals are saving power and reducing maintenance charges for the Tampa Electric Company.

The journals of all fifteen cars are equipped with

GURNEY

BALL BEARINGS

308



The Easy Riding Truck Era

THIS is the day of easy riding trucks, ushered in by the Graduated Spring System and Bolster Guide and these great advances in truck construction are doing much for car riders by saving them fatiguing and nerve racking jars and vibrations, conserving their strength for the busy day's work and carrying them restfully at its close. The easy riding trucks are doing a large part in increasing the riding habit and popularizing car riding generally. And, of course, the Graduated Spring System and Bolster Guide lengthen the life of cars, trucks and tracks and reduce maintenance costs. The Brill 39-E Truck, pictured above, has among its additional distinctive Brill features, solid forged side frames, transoms connected to the side frames by forged fold-over gusset plates and single and double corner brackets, half-ball brake hangers and oil-retaining center plates. Bulletin 227 gives full description, dimension tables and names of parts chart.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

BRILL

AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

The GE-258 Motor

For Fast Service and Less Maintenance

The GE-258 motor has the greatest capacity for its weight of any railway motor ever manufactured. This high capacity permits, without injury to the motors, the highest practicable rate of acceleration—a most important feature on frequent-stop lines and in congested streets, resulting in faster schedule speed. This attracts traffic, for passengers like the feeling of hustle and rapid movement which they obtain in these cars.

The low weight of these cars eliminates much of the repair work on the track, while the small current taken reduces wear on the trolley wire and requires less feeder copper.

25-1

General Electric Company

General Offices:

Sales Offi

Fifteen Cents Per Copy

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc.,
October 12, 1918

YMCA
ECONOMY RAILWAY METER
—Sold or Leased—
METER THE ENERGY—THAT'S WHAT YOU WANT TO SAVE
Economy Electric Devices Company, Chicago
BUY
LIBERT
BOND

Boston

HL Control

W
WESTINGHOUSE ELECTRIC

The Commonwealth of Massachusetts, appreciating the financial problem confronting the Boston Elevated Railway Company, which operates the subways, the elevated lines, and the surface lines in Boston, has enacted a law which guarantees a reasonable return on the investment, thus enabling the railway company to place orders for additional equipment, among which are 100 quadruple equipments of Westinghouse No. 514 Railway Motors, and HL Control.

They are also retiring a large number of obsolete motors. Westinghouse No. 306-CV Motors were selected to replace the 65 h.p. obsolete motors.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Buy More Bonds

No. 306-CV Motor

No. 514-A Motor

Westinghouse

Vol. 52, *No.* 15 New York, October 12, 1918 *Pages* 643 *to* 682

Electric Railway Journal

H. W. BLAKE, *Editor*

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This power system supplies traction, lighting and sundry power requirements in the electrified zone of the Central Argentine Railway in the suburbs of Buenos Aires, Argentina. It has made a remarkable record for continuity of service...Page 646

The Automatic Substation Has Come to Stay

Walter C. Slade tells why the field for automatic control is almost unlimited, but he declares that it must be used with due regard to economic considerations. ....Page 651

Women Help Relieve B. R. T. Mechanical Labor Scarcity

To help win the war women operate machines and perform the labor of inspection and overhauling of car equipment which was previously limited to men. ....Page 655

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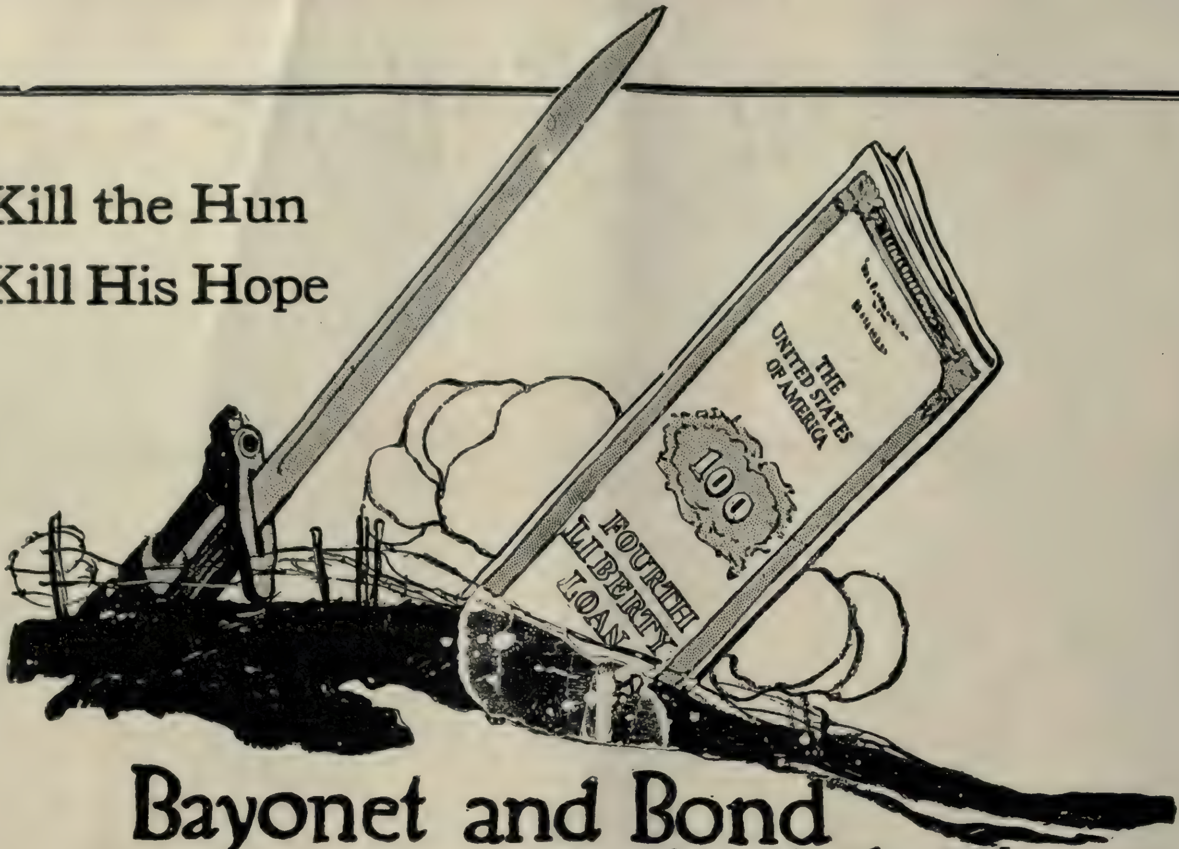
Kill the Hun
Kill His Hope


THE UNITED STATES OF AMERICA
100
FOURTH LIBERTY LOAN

Bayonet and Bond -both kill!

ONE KILLS the Hun, the other kills his hope. And to kill his hope of victory is as essential right now as to kill his fighting hordes. For while hope lasts, the Wolf of Prussia will force his subject soldiers to the fighting line.

We have floated other loans, built a great fleet of ships, sunk pirate submarines, sent our men across and shown the Kaiser's generals what American dash and grit and initiative can do. The Hun has felt the sting of our bullets and the thrust of our bayonets. He is beginning to understand America Aroused—to dread the weight of our arms and energy.

This is a crucial moment. Nothing can so smother the Hun morale, so blast his hopes, as a further message from a hundred million Freemen, a message that says in tones that cannot be misunderstood, "Our lives, our dollars, our ALL—these are in the fight for that Liberty which was made sacred by the sacrifices of our forefathers."

Buy U. S. Government Bonds Fourth Liberty Loan

Contributed through Division of Advertising — United States Govt. Commission on Public Information

This Space Contributed for the Winning of the War by
WESTINGHOUSE TRACTION BRAKE COMPANY, PITTSBURGH, PA.

Type BR Trolley Frogs

WESTINGHOUSE ELECTRIC

A large order for Westinghouse Type BR Trolley Frogs was recently placed with us by the Chicago Surface Lines, after winning out on a competitive test in service. These frogs are now in service in the loop district of Chicago, at very important places where continuity of service is of vital importance.

Westinghouse Electric & Mfg. Company
East Pittsburgh, Pa.

Westinghouse

Safety Car Control Equipment
Booms Mid-Day Travel by the Ladies

Bellingham's magnificent recapture and creation of traffic is the direct result of Safety Cars on short headways.

This picture indicates that part of the increased travel must come from women shoppers.

They would walk more or ride less if it wasn't for the pleasure of patronizing these fast low-step cars which have been made absolutely safe through the use of the Safety Car Control Equipment.

One ride added at mid-day is worth two at the rush hour. The Safety Car Equipment will help to achieve this result.

SAFETY CAR DEVICES COMPANY

Main Office: Boatmen's Bank Bldg., St. Louis

CHICAGO
Railway Exchange Bldg.

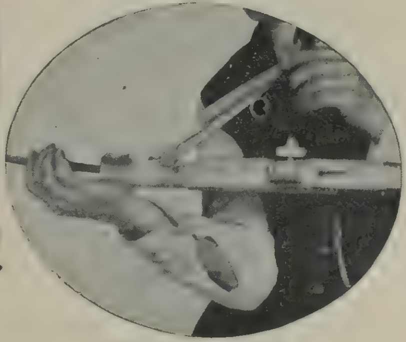
NEW YORK
City Investment Bldg.

PITTSBURGH
Westinghouse Bldg.

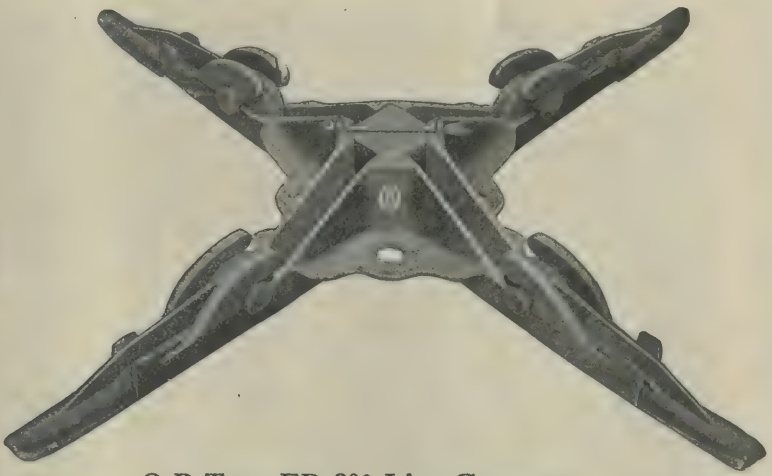
CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

PRODUCTS

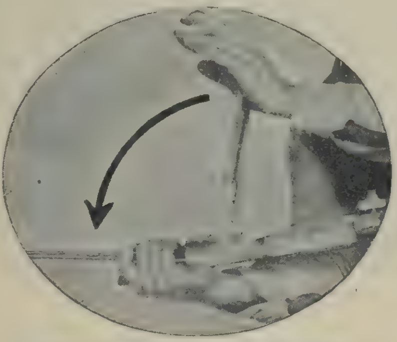
Quality First



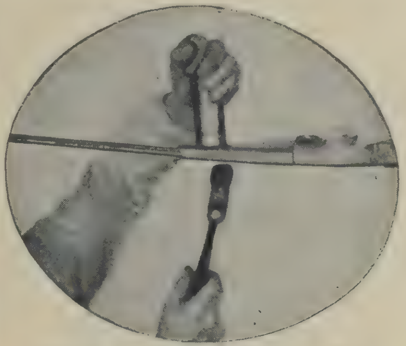
Slip tip under hooks—



O-B Type ER 90° Live Crossover
Also made in 8°, 15°, 23° and 35° Angles.



Turn over and down on the wire—



Clinch the lips and the job is done, Renewal is as simple.

A BETTER LINE WITH LESS LABOR

Present conditions emphasize the value of O-B Overhead Devices. They are time-saving, long-wearing, traffic-speeding products.

Take for example the O-B ER Crossover. Trolley wires are laid in grooves; compression block and cotter pin put in place; cam tips installed (see illustration at left) and it is ready for traffic.

And it is there for heavy service. The bronze tips provide a smooth, arc-reducing path for the wheel. They absorb the brunt of the wear. The main body is sturdy, malleable iron, weatherproofed by O-B Sherardizing.

Send for "Saving Time on the Line."

The Ohio Brass Company
Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles

At Busy Intersections Use

Phono-Electric

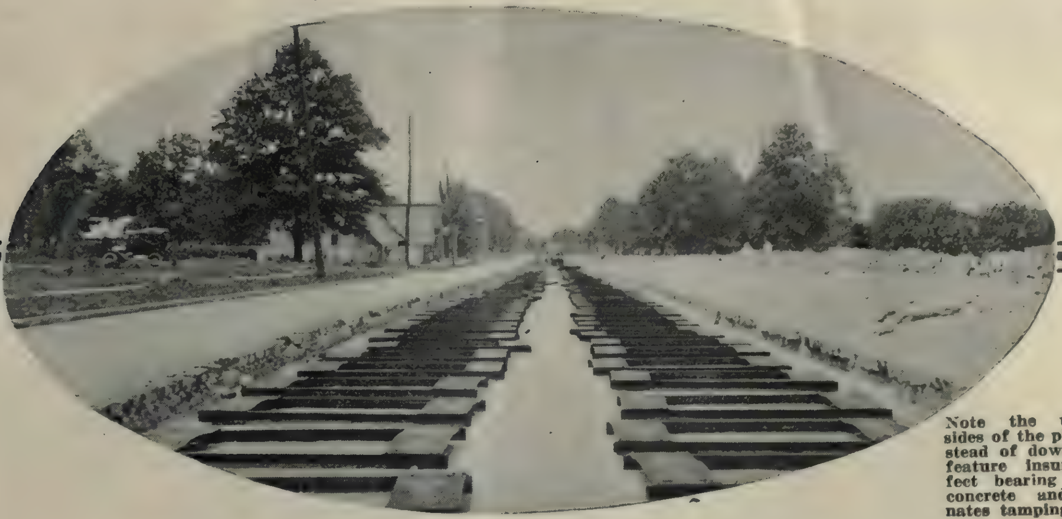
Front Street and Franklin Avenue, Houston, Texas.

Where the trolley wheels most frequently leave the wire, where the special work in the ground and the special work in the air get their hardest pounding—those are the places where Phono-Electric Trolley Wire shows most triumphantly its wonderful toughness and strength.

And because Phono-Electric Trolley Wire can absorb punishment so readily without crystallization and breakage it is the unquestioned choice of every line engineer who knows the relation between service continuity and car revenue.

Bridgeport Brass Company
Bridgeport Connecticut

3112



Note the upturned sides of the plates, instead of down. This feature insures perfect bearing on the concrete and eliminates tamping.

Material is Scarce—Labor is Scarcer

International Steel Ties

Save Both

When you consider that INTERNATIONAL Steel Twin Ties weigh no more than 8-ft. oak ties and that only one-third as many are required, you'll realize the tremendous possibilities of INTERNATIONAL Ties for solving war-time problems.

And right NOW is the time to make plans. Labor conditions will be no better next year and you'll find it just as difficult to get material. By using INTERNATIONAL Steel Twin Ties your present depleted track gang can construct as many feet of track per day as your 1916 gang did using wood ties.

Another BIG feature. The track that's laid on an INTERNATIONAL Steel Foundation is as PERMANENT and TROUBLE-PROOF as it is possible for man to build.

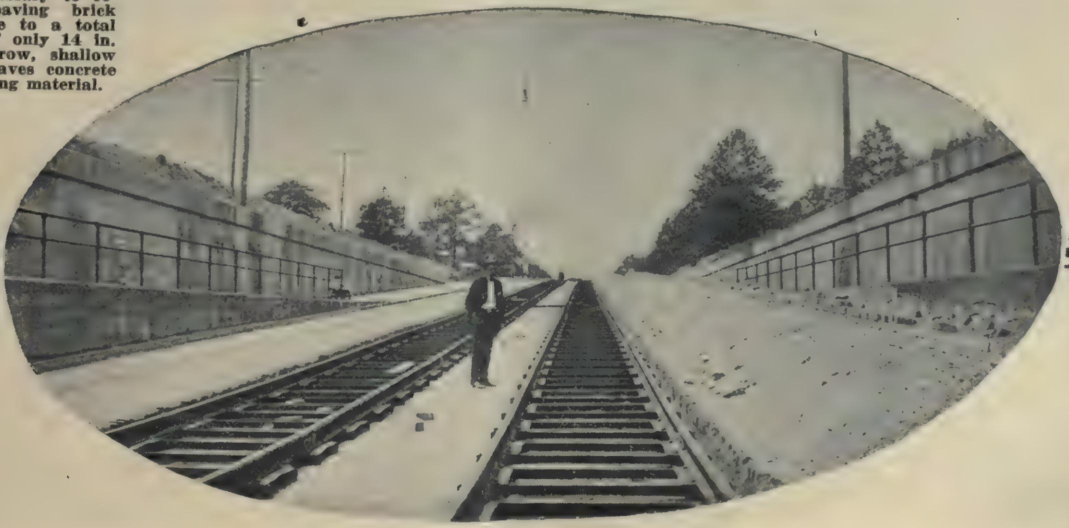
Our large stock of steel insures prompt delivery. Let us figure on your requirements.

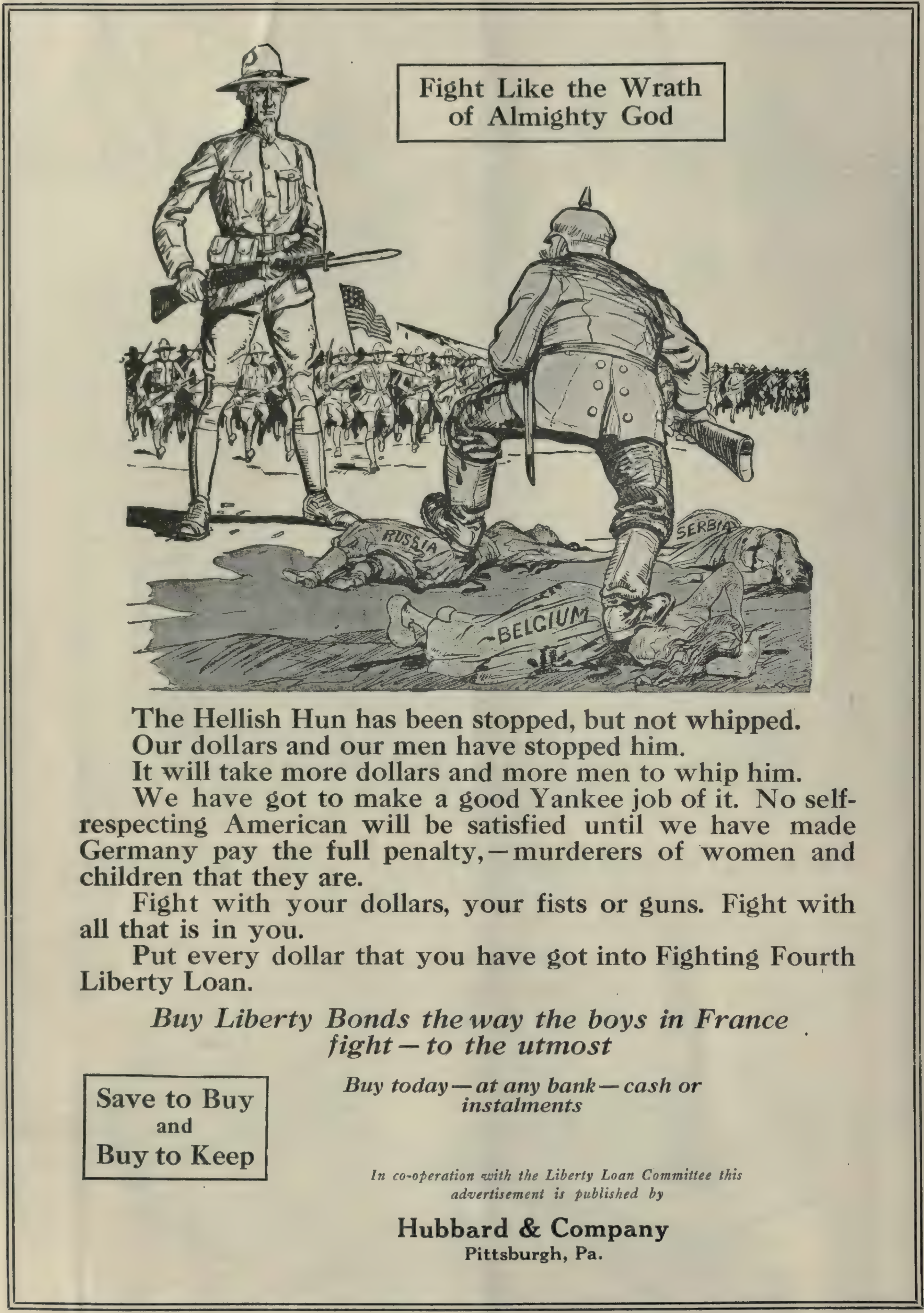
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

To lay this 6 in. 100 lb. A. R. A. Section it was necessary to remove paving brick and base to a total depth of only 14 in. The narrow, shallow trench saves concrete and paving material.





Fight Like the Wrath
of Almighty God

The Hellish Hun has been stopped, but not whipped.

Our dollars and our men have stopped him.

It will take more dollars and more men to whip him.

We have got to make a good Yankee job of it. No self-respecting American will be satisfied until we have made Germany pay the full penalty,—murderers of women and children that they are.

Fight with your dollars, your fists or guns. Fight with all that is in you.

Put every dollar that you have got into Fighting Fourth Liberty Loan.

Buy Liberty Bonds the way the boys in France fight—to the utmost

Save to Buy
and
Buy to Keep

Buy today—at any bank—cash or instalments

In co-operation with the Liberty Loan Committee this advertisement is published by

Hubbard & Company
Pittsburgh, Pa.

1250 Birney Safety Cars Are Keystone Equipped

The general adoption of Keystone Specialties on the famous Birney Safety Car furnishes a testimonial of inestimable value to all interested in this equipment. As is generally known, this type of car was designed with extraordinary knowledge of the requirements of present operating conditions. You'll find the following Keystone equipment on all Birney Safety Cars:

"Golden Glow" Incandescent Headlights
Illuminated Car Destination Signs
Faraday High Voltage Car Signals
Keystone Trolley Catchers
Keystone Air Sanders
Keystone Rotary Gongs

Surely this great triumph for Keystone Material is a message to you. If you are using this equipment you may feel complimented on your wise selection. If you are about to buy it there should be no hesitancy with this present triumph in view.

Thousands of Cars Are Keystone Equipped

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

IRON CULVERTS

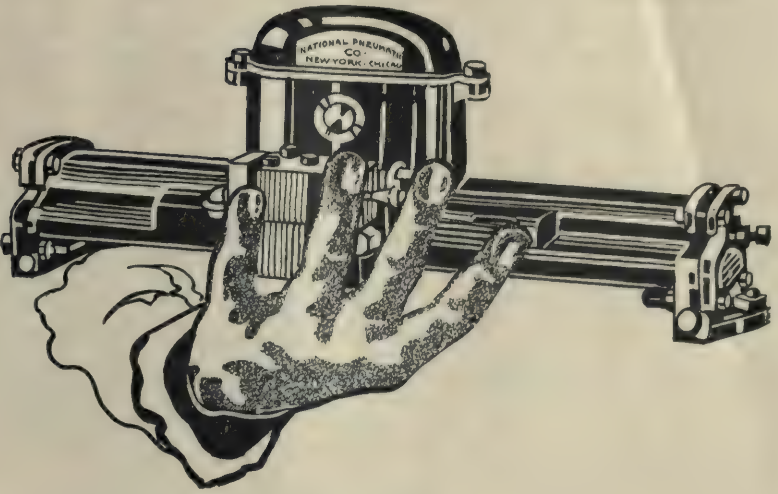
The preference shown for "Armco" Iron Culverts by leading railway and interurban lines is the result of experience.

"Armco" Iron Culverts have been on the market for years. They have been installed in all parts of the country—in all kinds of soils—and they have made good. *They last!*

Any of the culvert manufacturers named below can furnish you with indisputable proof of the unequaled rust-resisting qualities of "Armco" Iron Culverts. Among the multitude of installations that have been made there are sure to be some in your own vicinity. Let your own eyes convince you.

For full information on rust-resisting "Armco" Iron Culverts, Flumes, Tanks, Signs, Sheets, Roofing and Formed Products, address nearest manufacturer.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
Iowa, Des Moines
Iowa Pure Iron Co.
Iowa, Independence
Independence Cor Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
The Kentucky Culvert Mfg. Co.
Maryland, Baltimore
The Maryland Culvert & Metal Co.
Massachusetts, Palmer
New England Metal Culvert Co.
Michigan, Bark River
Bark River Bridge & Culvert Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Michigan, Bay City
U. S. Bridge & Culvert Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.
Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
New Hampshire, Nashua
Northeast Metal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Works
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal & Boiler Wks.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
Virginia Metal Mfg. Co., Inc.
Washington, Spokane
Spokane Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.
Canada — Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.



"Almost one-fourth of the Platform Men were ordinary laborers before entering the employ of the Company."

THIS is a quotation from a recent analysis of wage and working conditions on a large electric railway.

It bears out our oft-repeated statement that cars with hand-operated doors and steps do not tend to attract men of the clerical, *salesmanship* type despite the fact that they can frequently earn more money in platform service.

Men of husky build are scarce and costly today; they will be scarcer and costlier tomorrow. To avoid this crisis, equip your cars with

National Pneumatic Door and Step Control which demands no physical endurance from either man or woman

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York

515 Laflin St. Chicago

When Foch Says "Smash Em" the American Expeditionary Forces will smash them if they are equipped and ready. Foch hasn't said it yet— he isn't ready. But when he is—

Do you know what that hour, that moment will mean to the world? Foch is driving the enemy back to the point where they must stand and surely will make their critical stand. *Then, the last battle of the Great War will be fought.*

Either the Allies or the Germans will win—*a decisive victory.* It will be the Allies if Foch, when the moment comes, can call to the aid of his armies the great power, the fresh strength and the crushing initiative of the American Expeditionary Forces—if he can rely on an army fully equipped, morally backed by the money—the power to fight—of the United States of America.

Foch is going to say it soon—"Smash 'Em!" What kind of an answer is he going to get from our army, our American boys? He's going to get the right answer—the decisive, smashing, final blow! He's going to get it if *you* and *you* and *you* and all of us respond today and all this year with Bonds and Stamps—the money to give that answer when Foch says "We've crushed their line, we've crumpled their defense, now American soldiers 'Smash 'Em.'" Gentlemen, think this over. Then smash them with the biggest sale of Bonds and Stamps since this drive started.

W.S.S.
WAR SAVINGS STAMPS
ISSUED BY THE
UNITED STATES
GOVERNMENT

PIONEER DIVISION
National War Savings Committee
51 Chambers Street, New York

Space donated by
Electric Railway Journal

W.S.S.
WAR SAVINGS STAMPS
ISSUED BY THE
UNITED STATES
GOVERNMENT

Through 24-inch Snow Bank Like a Hot Knife Through Butter

Remmele Broom

"MAKES THE SWEEPER"

If you saw a Remmele Broom "in action" last winter you *saw something worth remembering!*

You saw a broom that cut through 24-inch snow banks without any perceptible effort and left *clean tracks* and *clean* pavements behind it—

besides covering three times more ground into the bargain!

And you're going to see Remmele Brooms on many of the most progressive electric railway lines all over the country *this coming winter.*

Street Railway Executives and Road Managers won't forget in a hurry the lesson of last winter. They won't forget how the snow drifts foiled the ordinary type of brooms, stalled the cars, disarranged schedules, lost fares, sent overhead expenses soaring and made thousands late for work And late workers now mean that vital *Government work* is held up and handicapped.

Last winter the Remmele Broom triumphed over every condition that put the ordinary sweeper broom out of business.

The Remmele Broom "stood the gaff," the strain and the pound of high speed 400 revolution-per-minute operation.

The Remmele Broom not only outlived a dozen ordinary types, but cut the *cost of feed* 50%. The reeds last twice as long. They don't break off. They stay effective. And when they *must* be replaced you can refill an entire broom *in less than* 60 *minutes* by a filling device we are putting on the market. Compare this with the 6 to 10 *hours* required by other types.

A glance at the way the reeds are put in explains this super-efficiency. The construction is strong and simple, and does not take away from the resiliency and toughness of the reeds so necessary to efficient work.

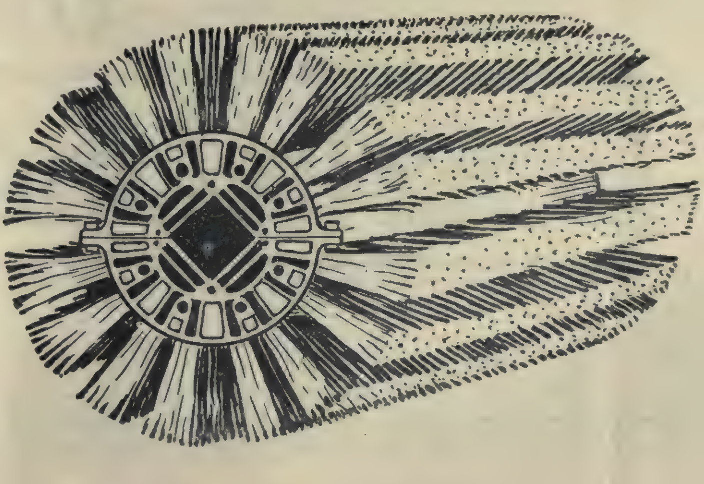
The Remmele Broom cuts *down the force of men you* ordinarily need for snow cleaning—

Cuts down the time ordinarily needed to clear your tracks.

Cuts down delays in schedules and, finally cuts the cost of broom up-keep to the lowest possible figure.

You can use Remmele Brooms on your old equipment without changes.

Every Reed
Over 100%
Service



REMMELE & MAIER

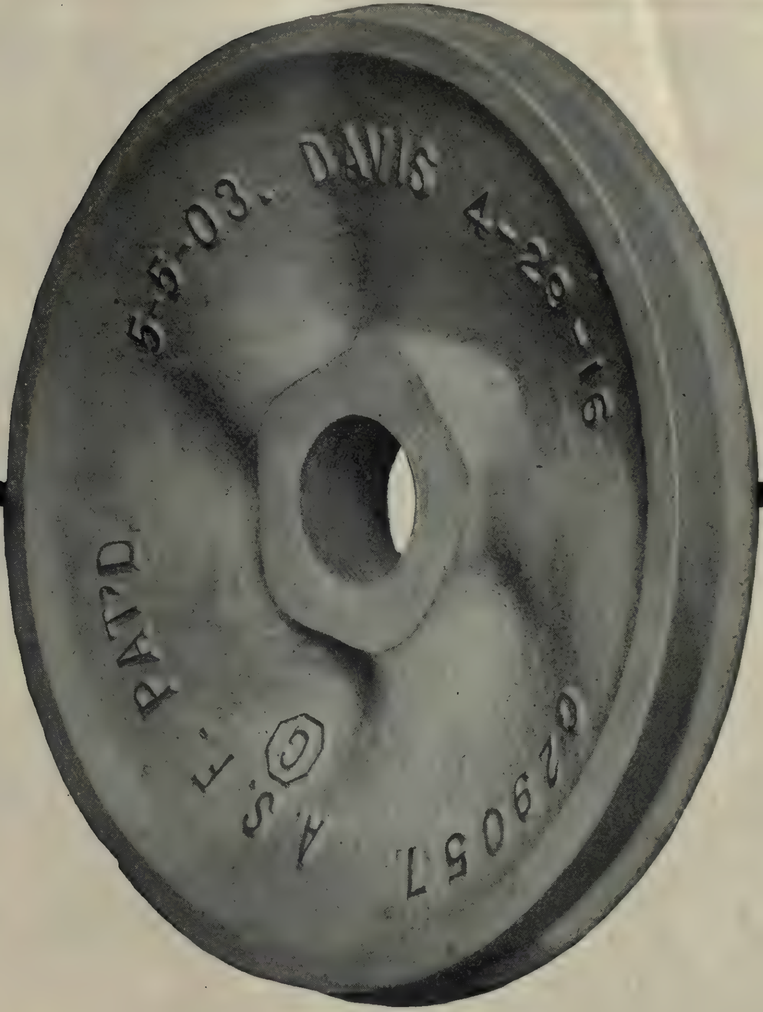
370-372 So. Seventh St., Newark, N. J.

These men crawl through shell-fire to give their comrades bread
Will you furnish the loaves?
France Aug 1918
Sketch by
C. Le Roy Baldridge, Pvt, Inf.,
with The Stars and Stripes
Official Publication of the A.E.F.

Fourth Liberty Loan

This Space Contributed to Winning the War by

The Electric Railway Improvement Co.
Cleveland, Ohio



The car wheel that invites tests—that's the Davis One-wear Steel Wheel.

Every Davis Wheel is subjected to most rigid tests at the plant where it is manufactured.

Some of these wheels have been given severe tests, by prospective users, for skidding, for slid-flats and for actual long wear—meeting every test satisfactorily.

AMERICAN STEEL FOUNDRIES
1100 McCormick Bldg., Chicago

DAVIS STEEL WHEELS

This space contributed to winning the war by the

LACKAWANNA STEEL COMPANY

Lackawanna, N. Y.

Sir Goldsworthy Gurney built a steam carriage in 1828 that seemed to bear out the most optimistic hopes of early inventors. For four months, four times a day, this carriage made its nine mile trips in less than 50 minutes without an accident. Its career was brought to an end and the development of steam carriages practically killed when, due to the malicious plotting of the enemies of progress, the "Turnpike Act" became a law.

This act made the profitable operation of steam carriages practically impossible because it so restricted their speed on public highways.

The Railroad Reared Its Head from the Steam Carriage Ruins

—and with the development of travel by rail the need for the lumbering road carriage was no longer felt.

Smoother and speedier travel was the order of the day—and the railroads met the demand.

The rapid growth of the cities due to the quicker transportation offered by the railroads would not have been so readily possible had there not been concurrent expansion in the street railway field.

The rapid expansion of the electric railways of our cities has made possible the swift development of the world's centers—made it possible for the workman to enjoy a home miles away from crowded factory districts, for farm lands to be laid out in city squares; made possible the rapid transportation of farm products to profitable city markets.

In short, our electric railways have been, to a large extent, the prime factors in the growth of most of our cities.

Galena Oils

and Galena Service — have helped to make possible the increased speeds, longer runs and heavier loads of today, without which the present high efficiencies of our electric lines could not have been attained.

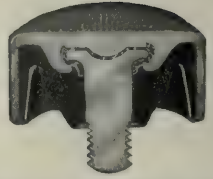
By developing a lubricant that gave a higher service efficiency than had ever before been thought possible.

By creating a lubricating service that has helped railway men to solve problems pertaining to lubrication and helped them to improve lubricating methods, this company feels that it has been a real factor in the electric railway development of this country.

Today Galena Oils are the recognized standard lubricants for railway equipment—they have been for nearly 50 years.

Galena-Signal Oil Co.

Franklin, Pa.



SECTIONAL VIEW OF SHELL
This construction is used in all H3 suspensions—straight line and curve.

Form H3 Curve Suspensions

are constructed with the stud mechanically fastened into the shell. Sheet insulation under compression insulates the two metal parts.

This construction gives the stud rugged strength and provides an ample margin of safety on the severest curves.

The H3 cannot fail due to fractured compound, hence the principal weakness of other suspensions has been eliminated.

Form H3 Curve Suspensions

40-21

GENERAL ELECTRIC COMPANY

General Office, Schenectady N.Y. Sales Offices in all large cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, October 12, 1918 *Number* 15

Railways Often Created Unprofitable Extra Traffic

THERE is a melancholy pleasure in delving through association transactions of a decade ago and seeing how little was really understood of traffic creation. The central idea seemed to be that of inducing extra travel for pleasure rather than for business. We read of how this park brought out the women and children, how the Elks were induced to ride to the trolley company's grounds at the rapacious price of 5 cents per head for 10 miles, how by a subscription of $500 the United Pretzel Benders convention was persuaded to go to Smithville and use the trolley touring cars, etc. All of these schemes and many more like them created traffic, but for a long time operators did not realize that it was often a mighty expensive kind of traffic; that park overhead went on for twelve months and the business for only three and that excessive Sunday and holiday traffic was rich in accidents and tiring to men who also wanted a little holiday of their own. It is strange that so few realized that the most profitable traffic created is that which fills in the valley between the peaks and which can be obtained almost entirely on business grounds. And through what the modern one-man car has taught us, the formula is absurdly simple: Service and speed. The American has proved the best rider in the world, regardless of price, when service and speed are at his command. Therein lies the open secret of creating the short-haul, between-the-peaks traffic that costs less instead of more than normal riding.

Have Staggered Hours Come to Stay?

FOR years staggered hours for business have been the day dream of most electric railway managers. They have realized that any way of spreading the rush hour would be of benefit to both company and public because is would permit more and better car service with no additional cars. On routes where traffic is already congested, and this is the condition in most of our large cities, the addition of cars would reduce the speed of those on the street and give no additional seats per hour past a given point. Hence, from a theoretical point of view, the plan of staggered hours is an excellent one from every view point. It has not been adopted because it ran counter to one of the most serious obstacles by which any reform can be opposed, namely, established habit.

People are accustomed to leaving their homes in the morning and returning in the evening at certain hours, and the conduct of their households has been established on that basis. This habit is not affected by the daylight-saving plan, first, because the hours for rising and other events are not changed, and, second, because everybody in the community is affected by the rule. But with the staggered hours the greater part of the working community has to begin work earlier or later than usual. In consequence, practically the only progress made in the establishment of staggered hours, up to within recently, has been where a large factory or group of factories has depended for its transportation upon an electric line of limited capacity. Here, changes of opening and closing hours of from fifteen to thirty minutes in individual factories or factory departments have sometimes been established, often grudgingly, by the factory managers. This reluctance to make changes, we believe, has been due not to any lack of willingness by the employers to co-operate, so far as they were concerned, but because they have not seen a strong demand for such changes from the employees for whose benefit the changes were primarily to be made.

Under the stress of conditions brought about by the present epidemic of influenza, however, there has been a marked change. The connection between the avoidance of crowds and the elimination of the rush hour is obvious. Washington was the first city to introduce the staggered hour system, but New York followed on Oct. 7. In some respects the change could be made more easily in Washington than in any other city because of the fact that so many of the people there work for one employer, namely, the government, which through its police powers can easily set the working hours of the rest of the population. When the plan of staggered hours was first suggested in Washington nine months or a year ago to relieve traffic congestion, much of the same inertia was encountered there as had been experienced elsewhere, but when its advantages as a precaution against the influenza epidemic were realized by the health authorities, action quickly followed.

The gain in Washington in the spread of openings of different government departments and business houses is marked. Formerly, with the exception of the Bureau of Engraving and Printing, which opened at 8 o'clock, all of the government departments as well as the business offices and stores began work within fifteen minutes, or between 8.45 and 9 a. m. Now, the opening hours extend from 8 a. m. to 10 a. m. or for two hours, exclusive of the Bureau of Engraving and Printing, and from 7.30 a. m. to 10 a. m. or for two and one-half hours, including that bureau.

In New York City the change can be considered little short of revolutionary, in view of the number of establishments involved. The situation in New York has an added complication because of the many commuters by steam railroad from New Jersey and other lines running into New York on which train schedules are much more rigid than on street railways. Nevertheless, the change in New York is working smoothly, and while the people have not yet become accustomed entirely to it no serious difficulties have developed. It was introduced in New York solely, of course, because of the prevalent influenza, but with the advantages shown we believe that some differentiation of hours will continue, even after the subsidence of the epidemic. So far as New York is concerned, the Board of Health has now established two precedents. The first is that it may summarily prohibit overcrowding of cars by limiting the number of passengers to be carried, as it did two years ago, and second, that it may make such prohibition practicable by ordering changes in business and industrial working periods.

Staggered hours are such a benefit to transportation companies that the latter should aim to give good service in the hours which were formerly the slack hours so as to prove to the public that the plan is really worth while.

Equipment, Brains and Skill Are Needed in the Power Plant

THE power end of the electric railway business is getting an unusual share of attention at this time because it is the physical movement of the cars by means of electric power that consumes fuel. The critical shortage in coal makes the people and their representatives, the government, very lenient toward any measure which will produce fuel saving. Thus there is added to the usual reasons for economical generation and use of electrical energy, and there are plenty of them, a very unusual one which is due to the war. The result will be that after the war the power plant, substation and transmission systems will show the effects of the strenuous efforts that have been made to keep them operating at high efficiency.

Several recent issues of the ELECTRIC RAILWAY JOURNAL have contained notable articles depicting the ways in which engineers and managers are meeting the needs of the hour in the power field. In this issue there is a rather remarkable collection of such articles which, taken together, form a power symposium of great interest. Of a general nature is a presentation of the power features of the Central Argentine Railway electrification. Although the power plant in this case is a small one, as power plants go in the United States, it is replete with modern devices for reducing labor and saving fuel. The high price of coal in the Argentine is sufficient reason for the latter policy. The substations are provided with devices for preventing flashovers, which have proved to be very successful. An ingenious plan is used for permitting the equalizing of load among substations.

In the field of the substation Walter C. Slade, superintendent of power and lines of the Rhode Island Company, discusses the automatic substation, particularly from the economic side. Although a firm believer in the "automatic," Mr. Slade does not consider it a panacea for all distribution ills. At the same time he sees a big future for it; first as a labor saver, second as an energy saver and third as a copper saver, to say nothing of minor points in its favor. Supplementing Mr. Slade's article is a brief account of one of the latest automatic substations, on the lines of the Columbus Railway, Power & Light Company, in which some original remote control "stunts" are combined with the standard features. Other articles tend to round out the power phases of this issue.

Zone-System Experiments Have Been Postponed Too Long

DURING the last two years, when most electric railways have been brought nearly to the verge of bankruptcy because of rising cost of operation, nearly all of the pleas made to public service commissions for higher fares have been for relief in the form of an increase from 5 cents to 6 or 7 cents. The petitioners asserted either that a flat fare increase was intrinsically the best or that it was at least the most expedient, in that it would give immediately the necessary revenue and permit without hardship to the railways the long investigation that would be required before a zone system could possibly be adopted.

Sufficient time has now elapsed so that the results attained by some of these fare increases are known. Briefly they show that traffic has fallen off to a larger extent than most of the petitioners probably believed would be the case. There has usually been some gain in revenue but far lower in percentage than the increase in fare. Only the last week, for instance, we published the first month's figures for the 7-cent fare on the publicly controlled lines in Boston, where a 40-per cent increase in fare produced in August only a 12-per cent gain in revenue.

It is true that under the pinch of hard times pleasure riding has diminished, that army service has reduced the number of men at home who ride and that automobile competition is heavy. It is equally true that a zone system would not be immune to these influences, but a zone system at least would not add to these troubles a discrimination against the most profitable class of passengers carried by an electric railway and the class which can most easily walk—the short-haul riders. To sum up this phase of the situation, therefore, it must be admitted that while the increases in revenue which have been secured through higher unit fares have been better than no increases at all, they have not provided permanent relief or even established a method whereby such relief can readily be secured.

It is not surprising, therefore, that many electric railway companies are now turning to the zone system for relief; in fact, we believe that if half of the energy spent upon securing higher unit fares had been devoted to study and experiments with the zone system, the industry would be farther advanced. While not capable of curing all electric railway ills or probably applicable to all companies, the zone system presents promise for relief to many which should not be ignored. The difficulties of fare collection seem serious, but we believe that with the initiative and genius for overcoming obstacles which have characterized the industry in the past, they will be overcome. When traffic experts recently asked the superintendent of a large system about the practicability of collecting zone fares he answered: "You work out the zone limits and establish reasonable fares, and I'll guarantee to collect them." This is the spirit to win over obstacles.

The Call for Women by the Railway Mechanical Department

THE introduction of women into occupations previously filled by men was discouraged in many quarters during the first year that the United States was engaged in this war. Early in 1918 the Secretary of Labor of the United States was quoted as expressing the opinion that there was an ample supply of labor both for the army and for industry, and that the policy of the labor administration was to prevent the introduction of the women into new occupations as long as men were available. This attitude was reflected in the position taken by many state councils of defense, official bodies and private associations. To-day, however, the needs of industry are becoming extremely acute and it is evident that the supply of men is not equal to the demand for labor. The Amalgamated Association of Street & Electric Railway Employees of America has changed its policy somewhat by recognizing the necessity of the employment of women under certain conditions.

While most of the discussion up to this time on the employment of women in railway work has related to their use on the platform, there are many places on an electric railway system where their services can be used to advantage. Of course before the war much of the cleaning of cars and the winding of coils, as well as a considerable amount of the clerical work in the offices of all departments was done by women, but since the war began and the labor shortage has increased, the opportunities for women have vastly increased, particularly in the mechanical department. This is shown by the records of the Brooklyn Rapid Transit Company whose practice in considerable detail in this regard is described in an article in this issue.

In Brooklyn the women who have taken up service in the mechanical department appear to come from other industries where the pay is less and the hours longer more than from a supply of new laborers entering the field. Most of the tasks on which they have been used up to the present time are those which do not require a great amount of technical skill but depend rather upon woman's natural sense of cleanliness, as well as on deftness of touch and rapidity of operation. There are many tasks of this kind in a railway car shop in addition to those in which women have been used extensively in the past, such as general cleaning, clerical work and stock taking. Thus, women have been used to good advantage in the disassembling and cleaning of the electrical apparatus, with its reassembling and testing after the several parts have been examined and painted or shellacked as needed. Work of this kind, which includes the inspection of the braking and other pneumatic equipment, calls for no small degree of intelligence.

For light bench and machine tool operation, which is also included in the scope of women's work in Brooklyn, it is obvious that the operators must be trained, so that it is too early yet in Brooklyn to form a definite conclusion as to women's usefulness, as the force of women whose service is measured by weeks and months is necessarily at a disadvantage when compared with one made up of men who have had years of service. In this connection, however, it might be said that the National Industrial Conference Board, in its recent research report No. 8, reaches the general conclusion that the efficiency of women as machine-tool operators depends more on their length of service than on the nature of the work. This conclusion is based on assembled information obtained from a large number of manufacturers in the metal trades who are using women extensively. Some of these employers report women as performing certain operations less efficiently than men, while others report the same class of work as being done successfully.

Some changes in shop organization, of course, are necessary where women are employed, as they seldom have the skill to set up the machine they use and they are unable to perform operations involving heavy work or lifting unless male helpers are provided. Additional accommodations must also be provided, such as wash, rest and lunch rooms.

The mixing of the women with men at work is necessary in most inspection and overhauling work. This has certain advantages, as the men can do the lifting and handling of heavy parts. In some states the work that women may perform is restricted. For instance, in New York, the law provides that women shall not lift weights in excess of 25 lb. and the grinding of metal parts is forbidden to women.

As a matter of safety and comfort some form of protective dress is essential. In the usual railway shop bloomers or overalls with a close-fitting cap to prevent loose hair from being caught are most generally used. When the reasons for wearing protective uniforms are properly explained usually no opposition is encountered. Objections are more easily overcome if the clothing is well and neatly designed.

Regarding the matter of wages it may be noted that the United States Department of Labor has declared itself in favor of equal wages for women performing the same work as men on government contracts and that a similar position has been taken by the Director General of Railroads in ordering the recent wage increases. There is a period of instruction and training, however, when women first enter railway work where their usefulness is comparatively small, and in justice to more experienced workers they should not receive the same compensation. But for light operation their employment by railways may be considered permanent.

A ONE-DAY CONFERENCE *of the American Electric Railway Association will be held in the United Engineering Societies' Building, 29 West Thirty-ninth Street, New York, on Friday, November* 1, 1918. *It will begin at* 9.30 *a. m. There will be a report from the Electric Railway War Board, and the subject of wages, revenues and finances will be discussed.*

Power Supply for the Central Argentine Electrification

This Power System Supplies Traction, Lighting and Sundry Power Requirements in the Electrified Zone of the Central Argentine Railway in the Suburbs of Buenos Aires, Argentina—It Has Made a Remarkable Record for Continuity of Service

IN LAST WEEK'S issue of the ELECTRIC RAILWAY JOURNAL an article was published giving the salient features of the electrification of the Central Argentine Railway excepting the power supply system. The provision for power supply is very complete, and includes a 15,000-kw., three-phase power plant, traction and other substations, and a complete alternating-current transmission and direct-current distribution system. Power is produced at 2500 volts, 25 cycles; is stepped up to 20,000 volts for transmission and is transformed to 800 volts direct current for traction purposes or other form as needed for lighting, power, etc. Supplementing last week's article, the following account of the power side of this installation will serve to complete the story of this modern electrification.

PROVISION MADE IN THE BOILER ROOM FOR COAL SHORTAGE

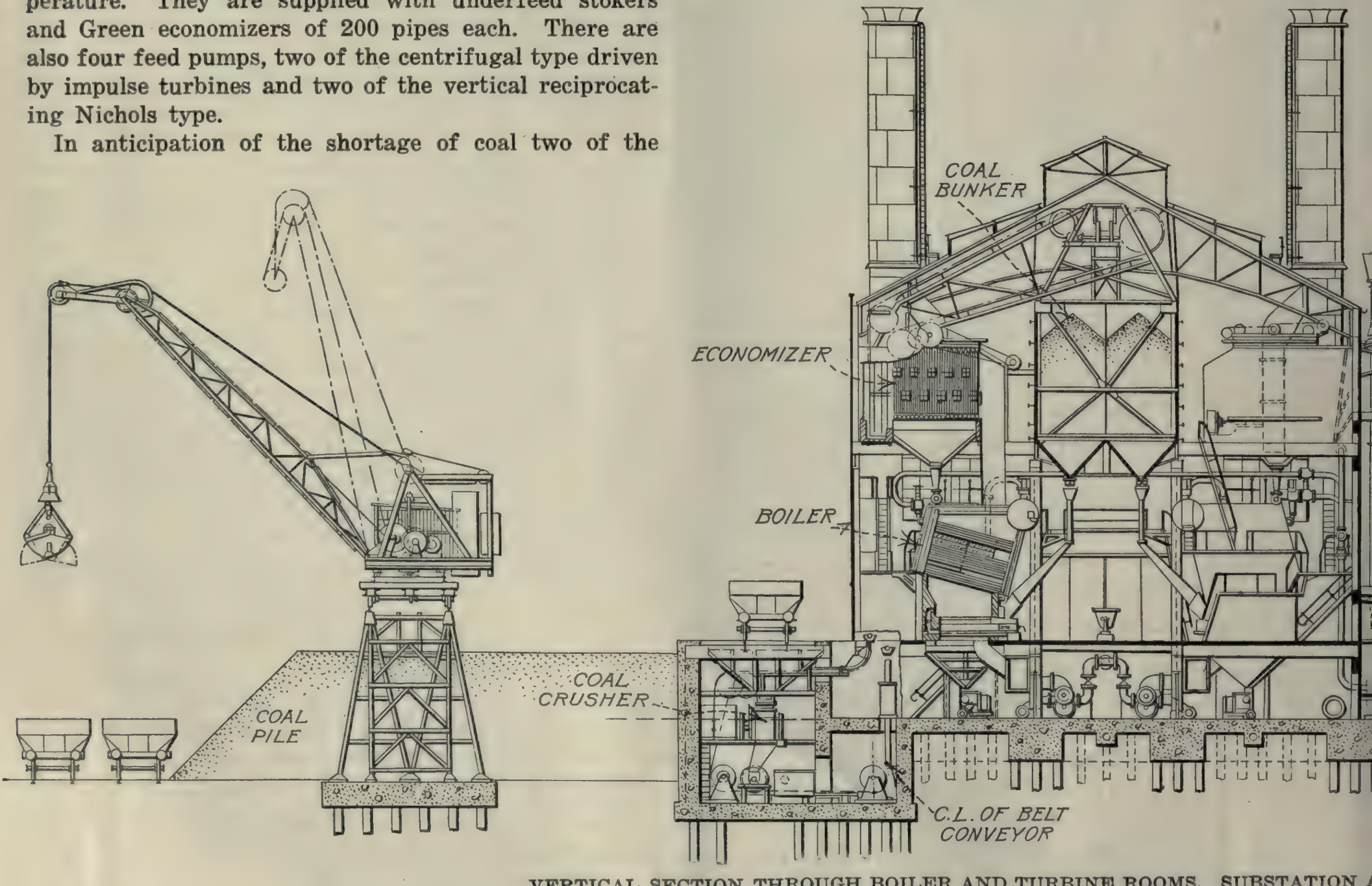
The boilers are designed for a working steam pressure of 210 lb. per square inch and 600 deg. Fahr. temperature. They are supplied with underfeed stokers and Green economizers of 200 pipes each. There are also four feed pumps, two of the centrifugal type driven by impulse turbines and two of the vertical reciprocating Nichols type.

In anticipation of the shortage of coal two of the boilers were arranged for oil firing and a complete equipment of the Wallsend-Howden system was provided, with the necessary storage tanks, filters and pumps. As the shortage of both coal and oil, due to war conditions, became more acute, other boilers were adapted for wood firing. The present situation will be understood by the statement that during a recent week the plant consumed 72½ tons of coal, 15½ tons of oil and 690 tons of wood. The calorific value of the wood is from a quarter to a third that of coal containing 15,000 B.t.u. per pound.

Water is pumped from the River Lujan to a reservoir, where it is treated with alumino-ferric to precipitate the sediment.

ALTERNATIVE ARRANGEMENT FOR COAL AND ASHES HANDLING

The storage and handling of coal is provided for by means of an elevated railway track running alongside the boiler house at firing floor level, a gantry running



VERTICAL SECTION THROUGH BOILER AND TURBINE ROOMS. SUBSTATION
For exact location see map on page

parallel to the buildings and carrying a jib crane with a 2-ton bucket, and two sidings at ground level.

The coal can be lifted from the railway cars and filled either direct into two 15-ton receiving hoppers, or into bottom-discharge wagons which can be hauled along the elevated siding by a winch until they come over the receiving hoppers. In the latter case the coal passes through crushers to gravity bucket conveyors by means of which it is elevated to a distributing conveyor, which in turn discharges it into the coal bunkers located above and between the two rows of boilers. The coal bunkers are of 1000-tons capacity, and they are built of mild steel plates lined with reinforced concrete and with bottoms V-shaped in sections.

The stock coal is lifted from the trucks and stored below and around the gantry in a coal deposit floored with ties and constructed within range of the jib crane, which can work to a radius of 50 ft. The stock storage is 10,000 tons.

The ash-handling arrangements comprise a suction ash plant with two 38-hp. exhausters which take the ashes from the furnace ashpits through electrically operated crushers and specially heavy cast-iron pipes to an 80-ton steel ash bunker lined with reinforced concrete. This is erected at the end of the boiler house at such a height that railway trucks can pass underneath it to receive and remove the ashes. Alternatively the ashes can be taken from the ashpits by half-ton wagons along tracks laid on each side of the boiler house basement and deposited outside the site.

TURBINE ROOM ARRANGED FOR FLEXIBILITY

The generating plant is so arranged that provided one boiler is steaming any one of the turbo-alternators can be used to feed the main busbars and all station auxiliaries. The breakdown of any part of one generating unit will not prevent the operation of the remaining sets. Each of the four turbines has its own steam-driven oil pump for use in starting up, its own condenser with air and water extraction pumps, and an independent circulating-water pump. On the electrical side it has a self-excited exciter, direct coupled to the alternator shaft.

Leads from the alternator run direct to the "unit" transformer which supplies the unit distribution board at 440 volts. From this board are fed the motors which operate the auxiliaries definitely belonging to the generating set to which it is attached. The station auxiliaries common to the whole station, such as economizers and fan motors, are fed from a station distribution board made up in four sections.

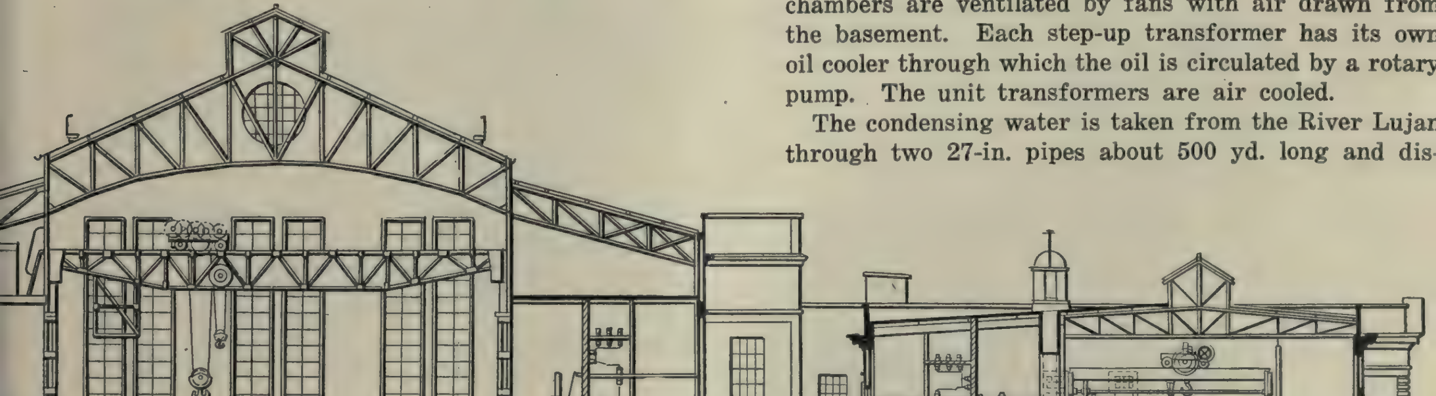
The main leads from the alternator run to a step-up transformer housed in the same compartment as the unit transformer, which raises the voltage from 2500 to 20,000. The station equipment as a whole is divided into two independent parts, and the main busbars are divided in the middle by a busbar sectionalizing switch.

The high and low-pressure portions of the turbines are in separate cylinders, the high-pressure cylinder being of cast steel. Each turbine is connected by an expansion pipe to the condenser situated below.

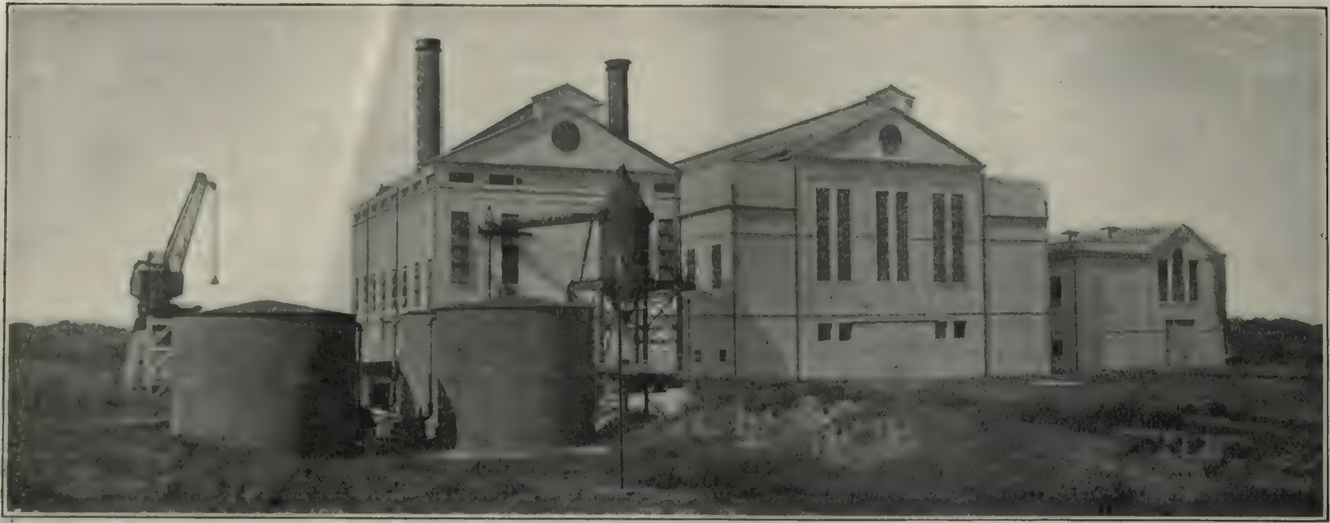
The alternators are totally inclosed and ventilated by fans on the rotors, which draw air from a basement through a dry-air filter and discharges it outside the turbine room. The combination of an alternator and a step-up transformer as one generating unit permitted the alternator voltage to be so selected as to give the simplest and most robust stator winding. The stator slots are completely closed and each contains but one conductor.

The step-up and unit transformers belonging to each generating set are housed in a separate chamber in the basement, with hatchways in the turbine-room floor through which they can be handled by the crane. These chambers are ventilated by fans with air drawn from the basement. Each step-up transformer has its own oil cooler through which the oil is circulated by a rotary pump. The unit transformers are air cooled.

The condensing water is taken from the River Lujan through two 27-in. pipes about 500 yd. long and dis-



COAL STORAGE OF THE CENTRAL ARGENTINE RAILWAYS POWER PLANT NEAR TIGRE
ELECTRIC RAILWAY JOURNAL for Oct. 5, 1918



A MODERN POWER PLANT NEAR BUENOS AIRES, ARGENTINA

charged into the Rio Rosquetes, a small creek. The condenser shells are of cast iron and the tube plates are of rolled brass 1⅛ in. thick. The tubes are ¾ in. external diameter and are of solid drawn copper No. 18 S. W. G. Aluminum blocks are fixed in the water chambers in metallic contact with the tube plates.

Centrifugal circulating pumps are used with bodies of cast iron and impellers of gunmetal. The circulating water pump motors are housed in a steel-frame, corrugated iron sheeted house erected on a wooden jetty projecting from the bank of the river. In addition to the main circulating-pump motors the jetty carries a centrifugal pump capable of delivering 300 gal. per minute against the head of 20 ft. or 95 ft. This supplies water through a 6-in. pipe either to the purified water reservoir or direct to the storage tanks in the pump house. Two motor-driven air exhausters are also located in the pump house, each capable of producing in three minutes a vacuum of 20 in. in any of the main pumps, including its suction pipe and discharge pipe up to the discharge valve.

SOME ELECTRICAL DETAILS OF THE POWER PLANT

All main switching in the plant is carried out at 20,000 volts, the main switch gear being located in a bay on the side of the turbine room opposite the pump house and boiler house. The operating gallery is about 4 ft. above the turbine room floor to give the operator a good view of the machines.

Each operating panel consists of two cast-iron plates built into a wall of molded concrete, 11 ft. high, faced with glazed tiles. This wall is set forward 3 ft. from the main panels and at the back carries the auxiliary wiring. On the generator panels the instruments are mounted on the wall above the upper cast-iron plates, and below them are the indicating lamps showing the oil switch positions. The operating levers, trip coils and time-limit fuses are carried on the plates, as are also the integrating wattmeters and several minor sets of switches. In front of the generator panels are pedestals carrying exciter equipment and the telegraph.

The main panels are formed of molded concrete cubicles 5 ft. wide, the main wall being 9 in. thick and the sides 4 in. These are separated each into five stories, occupied from the bottom up as follows: Potential transformers, cable isolating switches and current transformers, oil switches, busbar isolating switches and busbars. The compartments are protected by screens of standard metal interlocked with the main switch so that they can be opened only when the switch is opened.

Permanent testing busbars are provided in the generating panels, a water resistance being furnished to take the load of the generator under test.

The unit distribution boards are built up of enameled slate panels and have the busbars mounted in front. Porcelain-handled fuses connect the busbars to studs which pass through the slate to the motor leads at the back.

When the scheme was under consideration the split-conductor system of feeder protection had not been sufficiently tried out to justify its adoption in foreign work of such importance. Accordingly the high-tension transmission system was arranged to consist of 20,000-volt underground feeders with three simple cores, and pilot cables for the protective devices.

The high-tension cables are 1/10 sq.in. of section, and are of the three-core, paper-insulated, lead-covered, single-wire armored type. The pilot cables for the protective gear are 0.005 sq.in. in cross-section of the same general type, and the telephone cables are eight-pair, dry-core, air-spaced, paper-insulated, lead-covered, single-wire armored cables.

In general the three types of cables are laid in the same trench at a distance of about 1 in. from each other. Above the high-tension cable and about 4 in. from it is placed a creosoted plank. All joints in the high-tension cables were made in gunmetal sleeves, wiped to the lead of the cable, the sleeves themselves being surrounded by a creosoted wooden box with an iron cover. The sleeves were filled with compound. Wherever the armoring is interrupted the joint is spanned by a copper bond of 0.05 sq.in. section.

The direct-current feeders from the substations to the track and the jumpers spanning gaps in the conductor rail are of 1 sq.in. cross-section, paper insulated, vulcanized, bitumin sheathed, taped and braided. They are laid in fiber conduits filled with bitumen. They are supported in the conduits by fiber bridges, and a creosoted plank is laid over the conduits.

The line at present electrified is served by three traction substations and two general service substations. The former are located at San Fernando, about 1½ miles from the outer end of the line; at Olivos, about midway along the line, and at Palermo, about 2½ miles from the city terminus.

The traction substation buildings have steel frames and are walled with brick covered with reinforced cement plaster. The floors and roofs are of concrete reinforced with Clinton fabric, the roofs being flashed with ⅜ in. of rock asphalt. Provision is made at the substation for housing the attendants.

Each traction substation building is divided into three main aisles; the center one containing the rotary converters, the side ones containing the high-tension and direct-current switch gears respectively. There is a loading bay at one end into which a siding comes, so that railway trucks can be brought under the overhead crane which traverses the whole building.

The basement contains the main transformer, the potential and current transformers, the high and low-tension feeders, the rotary field rheostats, the lightning arresters and the batteries. On the first floor are the rotaries, the 800-volt switch gear, a motor-generator and, on a raised gallery, the high-tension operating gear.

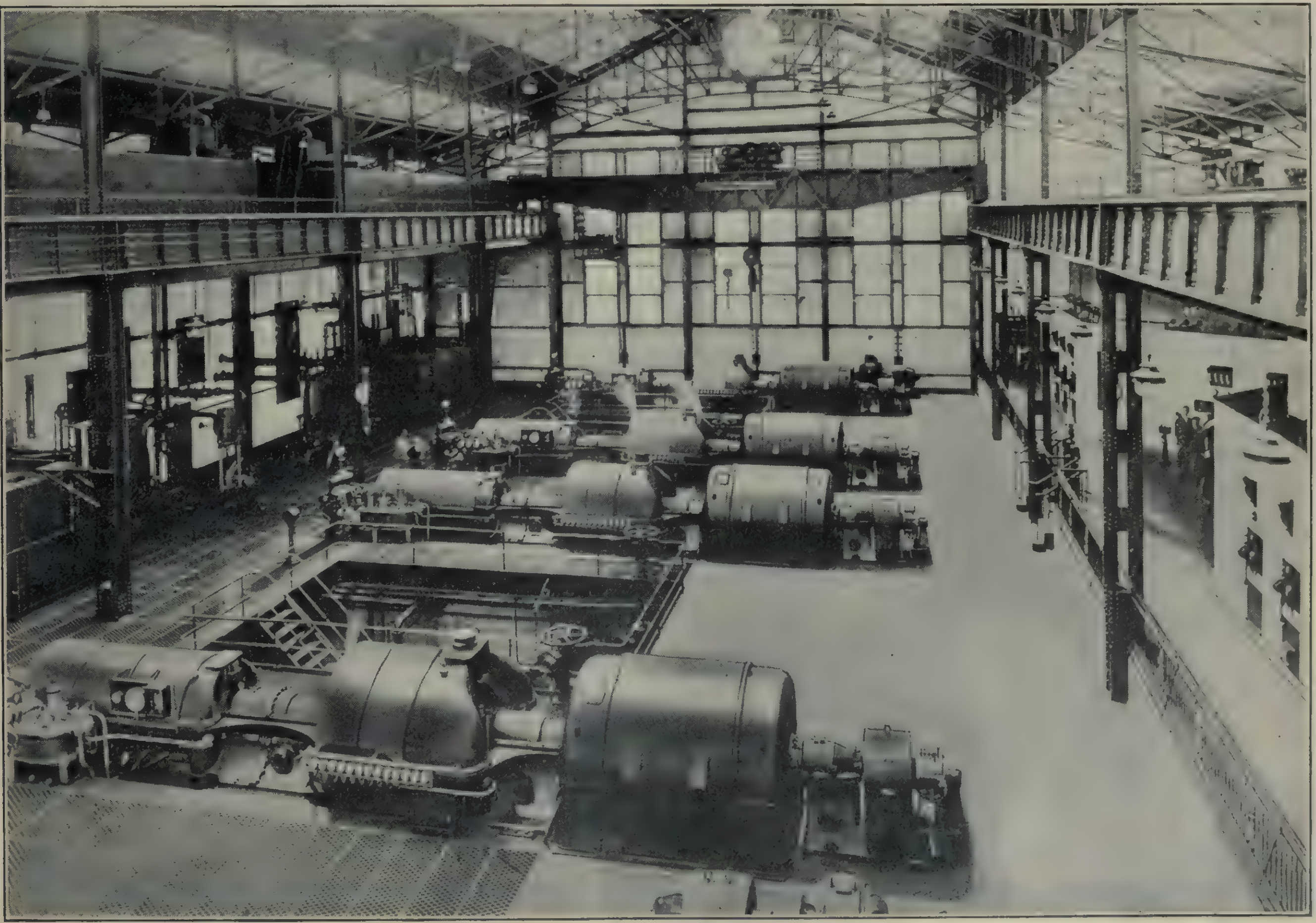
The high-tension gear is similar to that in the power station, the busbars being sectioned and interconnected by an oil switch. The two halves of the bars are fed by different cables.

Each traction substation contains three rotary converters of 1000-kw. normal rating. They are capable of carrying 1500 kw. for two hours, 2000 kw. for ten minutes and 3000 kw. momentarily. Each converter is served by three 375-kva. single-phase, oil-immersed, natural-cooled transformers. The substations also contain each a 10-kva. lighting transformer, a 5-kw. motor-generator set, an air compressor of a capacity of 39 cu.ft. of free air per minute at 60 lb. per square inch pressure, a ventilating fan of 25,000 cu.ft. per minute capacity and a 50-amp.-hr. storage battery.

PRECAUTIONS AGAINST FLASHOVERS

Special precautions have been taken to reduce flashover on the rotaries. For this purpose the commutator cones have been covered with projecting fiber sleeves, and all earthed metal near the commutators is painted with a composition made up of one-half gold size and one-half linseed oil. In addition screens have been fixed between the brushholders to prevent flashing around the commutators. By these and other means the number of flashovers was reduced from an average of six per month during the first six months of operation to a rate of two per month.

In Olivos substation a panel is installed carrying two center-zero voltmeters, connected to pilot wires running to the negative busbars of all three substations. A permanent deflection of one of the pointers indicates to the substation attendant that there is a difference of potential betwen the busbars in two adjoining substations and that one substation is "motoring" the other. He can then instruct one of the substations to



TURBINE ROOM, CENTRAL ARGENTINA RAILWAY'S POWER PLANT raise or lower its voltage until it is taking its proper share of the load.

Two substations are provided in the electrified section to give a supply for general purposes, one at the Retiro terminus and the other at the Victoria workshops. The former is designed to deal with the power and lighting requirements of the terminal station, trainyard and offices, and to give a supply for pumping and for operating the compressors of the pneumatic signaling system. The latter substation supplies power and light for the workshops, locomotive sheds, car sheds and repair shops at Victoria Station.

In the Retiro substation the internal design is similar to that of the traction substations. Space is reserved for two rotary converters which will be installed when the freight traffic in the yard and at the docks is handled electrically.

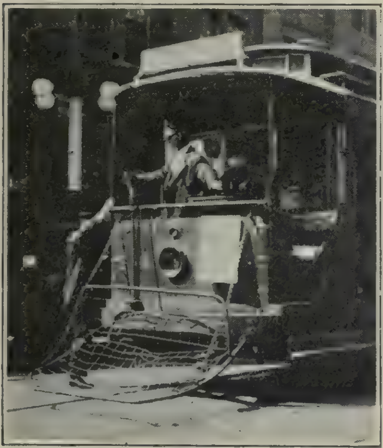
The Retiro substation contains motor-generator sets consisting of 440-volt induction motors, with output capacity of 400-kw. of direct-current power at 240 volts. With these are the necessary transformers and a 240-volt storage battery of 4000-amp.-hr. capacity. The Victoria substation contains only transformers.

The Victoria substation is a small building containing two banks of transformers with the necessary high-tension switch gear and low-tension panels.

The lighting of wayside stations along the electrified track is taken from the third-rail. The lifting circuits of these stations are arranged to take six 100-volt lamps in series.

Encouraging Short-Haul Traffic at Portland, Me.

ON THE Portland lines of the Cumberland County Power & Light Company cars operating on three routes with short runs carry passengers for a 5-cent fare, without transfer. Other cars operating in the city area are run on a 6-cent fare basis, and in some cases the routes overlap in part. To encourage riding on the shorter-haul lines and to reduce local travel on the longer or 6-cent lines, cars operated on routes covered in part by either class of fares are provided with dasher signs as illustrated, whereby the public is saved inconvenience and the railway service is the better maintained. Passengers are not kept off 6-cent cars, even for local riding, but the clear marking of both types of cars as respects fare unit throws the short-haul traffic on to the cars where it belongs. At the same time it enables a passenger who is in a hurry to take any car which he desires, provided he is willing to pay the extra cent for boarding the through car.



CAR WITH DASHER SIGN INDICATING FARE

Long Interburan Line Completed Near Barcelona

Part of the Extensive Electrical Development in Spain Which Was Initiated by the Late Dr. F. S. Pearson

THE longest interurban electric railway in Spain has recently been completed between Barcelona and Rubi by the Cataluna Railways, controlled by the Barcelona Traction, Light & Power Company. The road is a part of the extensive hydroelectric development in the neighborhood of Barcelona initiated under the direction of the late Dr. F. S. Pearson. This development includes the local railway, light and power system in Barcelona, the interurban railway mentioned, two different transmission lines at 110,000 volts between Barcelona and the Pyrenees, 125 miles away, and three hydroelectric plants in those mountains with a combined capacity at present of about 100,000 hp. A fourth plant with an additional 50,000 hp. is now under construction.

The largest of these plants develops 56,000 hp. The second and third plants were constructed at Tremp and Pobla and have an aggregate capacity of about 50,000 hp. The former, by the means of the Talarn dam (more than 250 meters in height), is one of the largest concrete dams in the world. Altogether the investment is about $60,000,000, and practically all the machinery, with the exception of the hydraulic turbines, which were made in Switzerland, was manufactured in the United States.

The first section of the electric interurban line was formerly operated by steam. This section has been extended so that the total length of the line when finished will be a little more than 20 miles. The line at present is running into Rubi and when completed will be operated as far as Tarassa, one of the most important textile manufacturing cities of Spain. The cars for the line were built in the United States, dismounted and shipped to Spain and there assembled. Ninety-pound rail is used with tie plates, creosoted ties and screw spikes with continuous joints. Catenary overhead construction is used. Six hundred volts is employed in the city proper and 1200 volts outside of the city. The cars are equipped with four motors of 125 hp. each, and bow collectors. There are five tunnels, all double tracked. The longest tunnel is a mile in length, and during its construction quicksands were encountered making the work exceedingly difficult. Some of the fills are more than 200 ft. high and ¼ mile in length.

The completion of the interurban railway, as well as the operation of the entire power and lighting system during the past three and one-half years, has been in the hands of H. P. Harrsen, who until 1915 was in charge of the Pearson railway and power interests in in the City of Mexico.

In a recent discussion of the cost of oxy-acetylene welding at a meeting of steam railroad mechanical men some data were given to show that the average cost of welding by this process is about $1 per cubic inch of weld. The data covered welds using from 1½ lb. to 2¾ lb. of welding metal, with acetylene at 3 cents per pound, oxygen at 14 cents per hundredweight, welding metal at 10 cents per pound and labor at 42 cents per hour.

The Automatic Substation Has Come to Sta

The Field for Automatic Control Is Almost Unlimited But It Must Be Used With Due Regard to Economic Considerations

BY WALTER C. SLADE
Superintendent of Power and Lines, The Rhode Island Company,
Providence, R. I.

WITH the price of copper about double that which prevailed before the World War; with an uncertain future to face as far as the re-establishment of normal prices is concerned, and with unparalleled advances in the wages of operating labor already allowed or of necessity to be granted, electrical engineers are confronted with serious distribution problems. They have been obliged and will be even more obliged to modify power distribution systems in a way that will, through conservation of construction material and operating labor, allow charges to be reduced sufficiently to offset in whole or in part the increased costs of construction, maintenance and operation.

It is perhaps the general belief that copper will never again be as cheap as it was prior to the war. Accordingly, new construction must be planned so as to save copper, and existing construction must be rearranged for the same purpose. This copper can be sold at a profit sufficient, in general, to compensate in part for the cost of the changes made. These remarks, of course, apply to the distribution copper necessary in any system of power distribution, and in particular to the great quantity of copper required for direct-current distribution feeders in the average railway system.

The use of additional substations is the one means of effecting these savings in material, provided that the capital, operating and maintenance charges combined are less with, than without, the additional substations. The substation, in the railway field at least, was never so important as at present.

AUTOMATIC CONTROL INVENTION WAS TIMELY

It is a strange but fortunate coincidence that almost at the commencement of the great war, E. W. Allen and Edward Taylor, with the co-operation of Bion J. Arnold, should have planned and applied successfully the first complete automatic control for railway substation equipment. When the automatic operation of the Union substation of the Elgin & Belvidere Street Railway was begun in December, 1914, the full importance of the achievement was incompletely realized. During less than four years this type of substation has come into prominence with surprising rapidity. It has supplied a demand in allowing marked reduction in operating cost and appreciable reduction in power consumption. It is now possible to save copper in distribution systems by the construction of an increased number of substations of reduced capacity previously found to be impracticable because of the cost of operating labor.

The use of the automatic substation is not confined to the railway industry alone, nor is it destined to occupy the whole field in any industry. The idea is, however, destined to find a place, in some cases a
large one, in every field where substations are e
ployed or where it is desirable to operate equipme
automatically.

Remote control of equipment is in some cases mo
desirable than automatic control, especially where t
requisite control circuits are short, or where the grou
ing of the stations to be controlled is advantageou
related to a central point of control. This would a
apply to those urban railway substations which conta
several machines at present designed for manual
eration and which stations are frequently grouped abo
a generating station symmetrically as regards lo
densities. Doubtless such station equipments, if au
matically controlled, would not have occasion to sh
down completely even for a few minutes, except possi
during the early morning hours.

FREQUENT STARTING AND STOPPING OF MACHINES UNDESIRABLE

On the other hand, it would not be desirable
have large machines stopping and starting frequen
throughout the day, as might happen with load fluct
tions where two or more machines were operat
automatically in the same stations. Occasional functi
ing of an additional machine would, however, not
objectionable and it would doubtless be called upon
serve daily during the peak-load periods. Equipme
in city substations can be run automatically, nevert
less, as is being demonstrated in Des Moines, Iowa.
that city the substations, although at present contain
single units, are designed for an ultimate capacity
two 500-kw. units to run in parallel.

Three remote-control lighting substations are in
on the system of the Detroit Edison Company, one
which has been in operation since 1912. There is a
a remote-control railway substation on the lines of
New South Wales Government Tramways at Sydn
Australia, which was put into operation in 1914.
Cedar Rapids, Iowa, the Iowa Railway & Light Compa
has made arrangements to operate either automatica
or by remote control the three 500-kw. water-wh
generators in its new hydro-electric station.

This application of automatic control at Cedar Rap
is of interest because it was the first attempt to
erate water-wheel generators in parallel automatica
There is also elsewhere a small 100-kw. d.c. wat
wheel generator in automatic operation, and a 30
kva. synchronous condenser with automatic control.

Substations for railway service have in the past b
manually operated. Conditions may make it advisa
to continue in service many of them under manual
eration. The size and importance of the station,
character of the service furnished, the fact that the s
tion may serve also as a switching center, the magnit

of the load to be handled and other factors will determine the matter. An attendant may be required for the performance of various duties aside from that of operating.

Aside from those stations now manually operated that could more advantageously be rearranged for operation by remote control, there are many others that should be rearranged for automatic operation, or at least reduced in capacity by removal of machines to more advantageous points. Thus some feeder copper could be removed and a higher potential could be maintained throughout the system.

Many substations of old construction, possibly located properly a decade or more ago, are inadvisedly located to-day. As traffic has grown the tendency has been to add equipment and feeder copper, but shifting load centers have often caused undesirable distribution losses. Increased operating cost proved a barrier to the addition of manually operated stations. This barrier does not exist to as great a degree with automatically operated stations. There are few distribution systems that could not be improved to-day by some use of automatic equipments.

THESE STATIONS ARE TYPICAL OF LATEST PRACTICE

The present status of automatic railway substation development shows remarkable progress. Aside from the installations previously referred to the following are of particular interest as being different from the substations in which single 600-volt converter or motor-generator units are controlled.

The 1200-volt automatic substation of the Milwaukee Electric Railway & Light Company at East Troy, Wis., contains four 300-kw. 600-volt converters, two of which are arranged to run in series. The two sets are, however, not arranged for parallel operation, one simply serving as a utility set.

The first installation of machines arranged to operate in parallel is in the substation of the Rhode Island Company at Oakland, R. I. This station, which will be described in a succeeding article, contains two 300-kw., 600-volt, synchronous converters, taking energy from a 25-cycle, 13,200-volt transmission line. One machine operates about eighteen hours a day, while both machines operate generally over the morning and evening peak periods and on Saturday afternoons and Sundays when the car service is increased. Both machines operate entirely automatically, and by means of a transfer switch in the control circuits either machine can be made to act as the leading machine. The writer is advised that in the near future two 600-kw., 1500-volt, motor-generator sets are to be arranged for automatic operation.

PORTABLE SUBSTATIONS LEND THEMSELVES WELL TO AUTOMATIC CONTROL

Automatic control is not confined to permanent substation equipment. Two portable substation equipments are already in operation. One of these contains a 500-kw. synchronous converter. It serves as a utility station as well as its main purpose in the summer season, for it is equipped for operation either on the 4400-volt supply of the Des Moines city system or on the 23,000-volt supply of the Interurban Railway where it is used to supply power on a spur track which leads to a gravel pit. A third portable automatic station is in process of manufacture.

The portable substation, although primarily intended for emergency or seasonal use, has often been used in a fixed location for permanent use and has accordingly afforded quarters far too confined for sheltering the substation attendant day after day. It therefore furnishes an excellent field for the application of automatic control. Without the necessity of planning for the operator's comfort or discomfort, and of setting space aside for this purpose, it is entirely possible to construct portable substation equipments with necessary automatic control up to capacities of 1000 kw. to 1500 kw., limitations being set by the supply voltage and frequency.

Lightning protection equipment, at least that involving the electrolytic aluminum arrester, would probably have to be omitted from the car in case of the larger units mentioned. It could be easily supplied as a separate portable equipment where advisable.

Such portable equipment as that suggested would generally be serviceable in cities where the capacity of the portable automatically controlled unit would be comparable in magnitude with the capacities of the units in the permanent substations, and in some cases it might equal the total capacity of some of the smaller stations. Besides, a spare operator would not be required to operate the spare equipment which is an important consideration these days. Finally, it is interesting to observe that automatic control has not been confined to small units. In the near future it will be applied to units in capacities ranging from 1000 kw. to 2000 kw. These larger machines are in most cases interpole machines provided with motor mechanisms for raising and lowering the brushes automatically as required in starting. The human element in this important operation is therefore eliminated.

AUTOMATIC CONTROL ALREADY BECOMING STANDARDIZED

The type of automatic control developed by the General Electric Company was described in the A. I. E. E. *Proceedings* for September, 1915, by Messrs. Allen and Taylor, and also in the Sept. 18, 1915, issue of the ELECTRIC RAILWAY JOURNAL. This company has made a few minor changes in the control equipment originally described, and has applied the system of control to many types of machines, such as synchronous converters, synchronous condensers, motor-generators and waterwheel generators. The Westinghouse type of control differs from the General Electric mainly in that while in the latter a motor-driven controller and exciter are employed for determining the sequence of operations and at proper time fixing the polarity of the field of the machine to be started, in the former the sequence of operations is obtained through a suitable combination of interconnected relays and control circuits. In the Westinghouse control a pole on the machine to be started is automatically "slipped" in case the polarity should fail to remain established from the previous operation of the machine. In both systems relays of both the instantaneous and time-element type are employed, as well as thermostats for protection against overheating of bearings and resistor grids. The main difference lies in types of design and methods of operation. Both systems employ the resistors to limit the output of the machine on overload or on external short-circuit. The Westinghouse system was described in the ELECTRIC RAILWAY JOURNAL of April 13, 1918. The system has been developed particularly for the railway converter substation and has in a short time found application in a rapidly increasing number of installations, some of which are now in operation.

Through the courtesy of C. M. Davis of the General Electric Company and R. J. Wensley of the Westinghouse Electric & Manufacturing Company the writer can give some data as to the present status of the automatic substation. There are twenty-nine equipments in operation and thirty-six equipments are in process of manufacture, giving a combined total of sixty-five. Of the equipments now operating, three arranged to control brush-raising devices on interpole converters. Of the forthcoming equipments eleven will control interpole machines and five will control motor-generator sets. About one-fourth of the equipments for synchronous converters will control interpole machines. The tendency for railway engineers to rearrange existing substation equipments for automatic control is clearly shown by the fact that thirty-one equipments out of the total of sixty-five, nearly one-half, are operating or will be installed in stations previously operated manually. In most if not all of the manually-operated stations that have been arranged for automatic control the old wiring and switchbord panels have been retained so that the stations may be operated with the old manual equipment if desired. In the newer stations, however, the designers have assumed that the automatic equipment will function reliably, so that only the automatic contactors and relays have been included. The additional expense for manually-operated switchboards has been considered unnecessary or at least not commensurate with the additional flexibility or dependability of the stations.

MR. SLADE has had exceptional opportunities for studying the automatic substation question from several angles, and he is applying the correct principles on the lines of the Rhode Island Company as rapidly as economic conditions will permit. In the preparation of this article, outlining the present status of the automatic substation, he has had the co-operation of the engineers of the manufacturing companies. In a later article he will show how the principles touched upon are illustrated in the latest substation on this property.

To furnish a perspective view of the increase in fixed and operating charges incidental to automization let it be assumed that it costs about $7,000 more to make an equipment entirely automatic than it does to install the necessary panels and switches for manual operation, not including machines of 1000-kw. capacity and larger. Taking interest, depreciation and taxes at 12 per cent, the annual charge is $840. Expense of inspection labor chargeable to any automatic installation will vary widely depending on local conditions and on the point of view of the individual who is responsible for the maintenance of the stations. Assuming a salary of $1,200 per annum and allowing the equivalent of a day only per week pe
equipment for inspection work, an ample allowance, th
calculated cost of the inspection becomes $200. Maintenance expense for the automatic relays and contactor
and other control equipment is difficult to estimate a
this time, but for the sake of approximate calculatio
can be placed at $250. The total of $1,290 arrived a
represents fixed and maintenance charges on the automatic part of the equipment and all of the inspectio
labor expense, applied only as above specified. Agains
these figures must be set the operator's wages for th
manually-operated substation which to-day would amoun
per annum to hardly less than $1,500 for a one-ma
station and $2,600 for a two-man station.

From the point of view o
the operator's wages, it woul
pay to automatize any two-ma
station but possibly not som
isolated one-man stations. Th
majority of such stations ar
located on suburban or interurban lines where the schedul
is either on the hourly or two
hour basis. It happens thu
that the energy saving possible from the automatic shutdowns to be expected on suc
roads will permit automatization which would not be justified from reduction in th
operating expense alone. Th
financial saving may, howeve
not be commensurate with th
energy saving in those instances where electric energ
is purchased on a basis of
service charge plus an energ
charge. The present tendenc
of central stations to sell electric energy for power loads o
this basis, combined wit
other unfavorable condition
may preclude making the station automatic. It thus ma
be cheaper for the consume
to waste energy than to sav
it. In case of new installations in new substation locations it may be possible t
remove sufficient feeder copper so that the added fixe
charges created by the substation development are compensated for in part or in whole by the fixed charge
saved in the copper removed from service. In one instance an automatic substation was built on a trolle
line formerly supplied with power from a distan
booster. Here the copper removed approximately offse
the cost of the development, at war-time prices of meta
The voltage regulation is much better at the same time

WHY THE AUTHOR FAVORS AUTOMATIC OPERATION

The writer is strongly in favor of automatic operatio
wherever possible. Dependable automatic equipmen
does not forget, whereas the "human element" is alway
present even in the experienced operator. To-day man
companies are obliged to employ inexperienced men t
operate important and valuable equipment, the tempor

ary loss of which would paralyze a part of the power system. More automatically controlled substations can be operated within a given area than could ever be operated economically under manual control. With a system of automatic stations advantageously laid out, in case of unforeseen accident a single machine or even a single station could be eliminated during repairs without affecting the system as a whole seriously enough to interrupt service.

ACCIDENT HAZARD REDUCED TO MINIMUM

Accidents are possible in any substation. Those due to neglect by the operator would be eliminated in the automatic station; other accidents would happen in any case. The automatic protective equipment is designed to limit and localize the accident damage, which it does in some cases more efficiently than an operator could do. Protection is provided against reverse current, overloads, heated bearings, overspeed, and other abnormal conditions. Some of the protective features alone are sufficiently valuable to warrant installation in manually-operated stations. That the value of the load-limiting resistors for example, is appreciated by some engineers is shown by the equipping of seven manually-operated stations with them to supplement the circuit breakers. Lightning may do damage in any substation including automatic stations, but this can be prevented or limited by generous use of good lightning arrester equipment on both the direct-current and the alternating-current sides of the station, and delays to service will be short if the few instruments or relays mainly subject to damage are duplicated in stock. Besides, an automatic station can be run manually when necessary.

One disadvantage of the automatic substation must be admitted. If the oil switch that controls the station is tripped due to overload much beyond that which the converting or generating equipment is designed to handle the station shuts down until the inspector arrives. The cause of the shutdown may be in evidence and justifiable, but again it may not be so. The rule is that the oil switch is set not to trip unless necessary to protect the station. The real delay occurs because an inspector is not always present to determine immediately the cause of the trouble, to take steps immediately to correct it and to place the station once again in operation.

AUTOMATICS CAN BE USED IN AS WELL AS BETWEEN CITIES

In the past automatic substations have been talked of principally as a proposition for interurban lines or suburban lines having infrequent service. It is the writer's belief that they are useful in some city service. In some cities the best plan lies in automatizing all of the substation equipment, excepting possibly that which may be located in the generating station. In any city certain divisions of the power distribution system, if not handled advantageously by remotely controlled substations, can be handled entirely satisfactorily by automatically controlled substations. This will allow the removal of unsightly feeder lines, thus postponing the day when the generally increasing cry for underground construction on the part of municipalities may have to be answered. When underground construction must come it will be a more attractive proposition to build the few ducts required for the transmission service and the greatly reduced number of distribution feeders than it would be to accommodate the number of feeders that would have to be retained as well as future feeders for handling the output from the smaller number of large manually-operated stations. Another advantage in increasing the number of substations in many cities would lie in the fact that the negative track return would be divided into relative small subdivisions so that the over-all voltage drop from the outlying regions served by the individual stations would be reduced to maximum values much under the maximum values previously obtained. Negative feeder copper could consequently be removed in many instances.

Making It Pleasant for the Men at El Paso

FOR a property with only 166 trainmen, the El Paso (Tex.) Electric Railway has an unusually pleasant brick clubhouse to which a cost-price restaurant has been added. The bungalow style of the building is well shown in the accompanying illustration. Alongside the clubhouse the company maintains a fine lawn, a real luxury there, and also a tennis court. The clubhouse is for the use of all employees of the El Paso Electric Railway.

The main floor has the dispatcher's or trainmaster's office on one side of the lobby and the superintendent's on the other side. The remainder of the floor space is occupied by the general recreation room, except that one rear corner is used for the office of the night cashier.

PLEASANT CLUBHOUSE ERECTED FOR EL PASO MEN

In one part of the basement are the toilet, shower baths and lockers. In another is the lunchroom. This is open from 7 p.m. to 7 a.m. and is in charge of one cook and one helper. The menu is printed on a blackboard. Simple food of the best sort is served; even individual bottles of milk are used.

The restaurant was opened on May 14 and is averaging $20 a night. Purchases may be made with tickets only. At the end of every month a public accounting is made, and the prices are adjusted accordingly. The first month showed about $100 surplus, or enough to pay for the help after caring for supplies and gas. Everything else is paid for by the company.

Women Help Relieve Labor Scarcity in B. R. T. Mechanical Department

To Help Win the War Women Operate Machines and Perform the Labor of Inspection and Overhauling of Car Equipment Which Was Previously Limited to Men

HE WHO RUNS and reads cannot fail to realize that women are assisting with all classes of work to help relieve the labor shortage and fill the breach in our man power left by the war. Electric roads were early to recognize the field they had for women workers as clerks, ticket sellers, station agents, conductors, car cleaners and the like. Now necessity has widened the field and women are found employed in the shops of the Brooklyn Rapid Transit Company on work that would not have been considered suitable for them a year ago. Up to Sept. 15 the mechanical department of the company had on its payrolls 120 women workers who were performing all classes of duties in the inspection, overhauling, maintenance and repair of electric car equipment. This enforced employment of women has brought new problems in shop arrangement and management. Sections have been partitioned off and screened from the sections where the men are employed to afford as much privacy as possible, and new locker rooms, rest rooms, wash rooms and lunch rooms have been built for the sole use of the women. The aptitude which these women have shown toward learning their new duties has surprised the shop foremen, and they have picked up the use of the necessary tools with remarkable quickness. The great majority of the women who have sought these new occupations are efficient, faithful workers who find the new lines of work very interesting. In assigning work to the various women applicants, great care has been taken to make certain that the duties do not require unusual physical effort and that the strength of the employees is not apt to be overtaxed. Some of the duties which these workers are performing are as follows: Inspection, cleaning, oiling and adjusting of controllers of both hand and multiple-unit types; replacement of excessively worn small parts, such as contacts, fingers, arc deflectors, insulation shields and the like which can be done without dismantling the heavier parts. On cars which are in the shops for overhauling, women assist in dismantling and reassembling the smaller parts, and they clean, shellac or paint the different pieces. On multiple-unit equipments they check the sequence of operation of the switches and relays; and make certain that reverser and line switches function properly and that overload trips and circuit breakers can be properly reset. In this inspection one woman operates the control from the motorman's cab while the other, underneath the car, checks its operation.

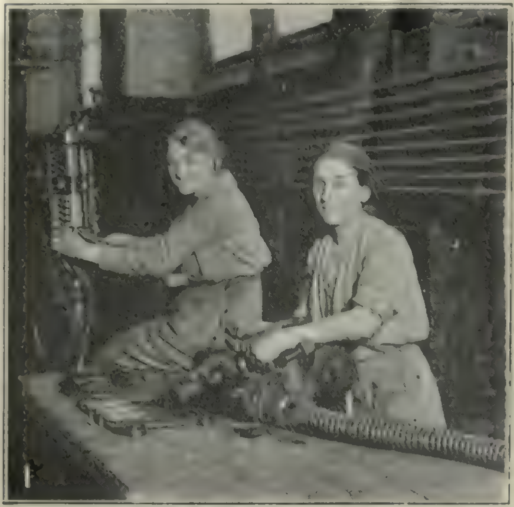
Air-brake parts, such as brake valves, feed valves, governors, whistles, etc., are also cleaned, oiled and tested on the cars in a manner similar to the treatment of controller parts. Women are also employed at the bench in cleaning, adjusting and resetting feed valves and governors. In cases where leaky valves are found, causing "creepage" of the air pressure, these are set aside to have valve seats reground or other repairs made by experienced workmen. After this work is finished the parts are again turned over to the women for testing and adjustment.

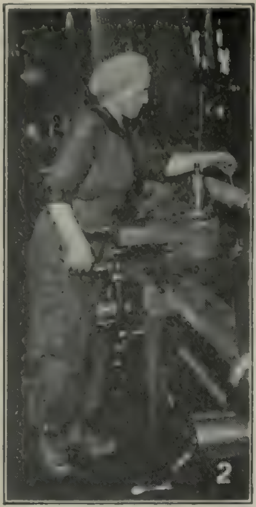
WOMEN'S LUNCH AND LOCKER ROOM AT SOUTHERN DIVISION INSPECTION AND OVERHAULING SHOP

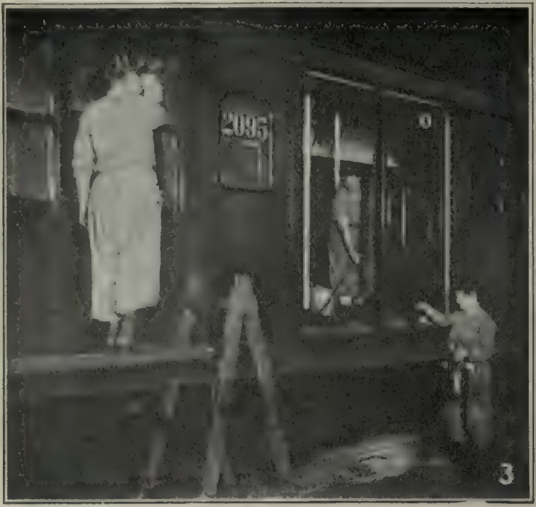
Door Engines Are Inspected and Adjusted

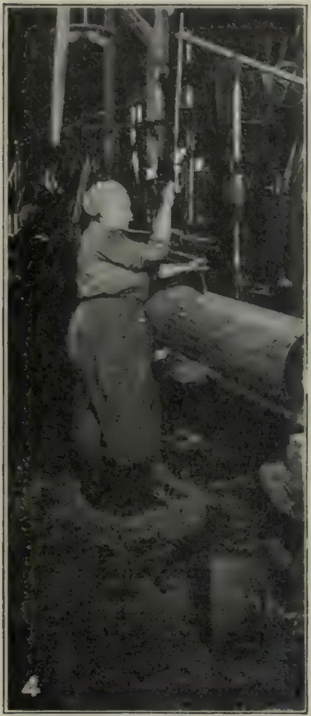
Another class of work on which the women are making good is in inspecting and overhauling electropneumatic door engines. Women inspectors test the operation of the doors, make adjustments, and oil moving parts and door races. Where trouble that requires the services of a skilled workman is found this fact is reported and a man makes the repairs. On cars which are in the shops for overhauling, women remove the inside panels at the engines, help dismantle the various parts, and clean, oil and put them in satisfactory operating condition. The inspection of lamps and signals is another class of work that has been taken up readily by the women. As most of this trouble is due to broken or burned-out lamps, the women can replace the lamps and "O.K" the cars again for service in most cases without calling in the aid of an electrician.

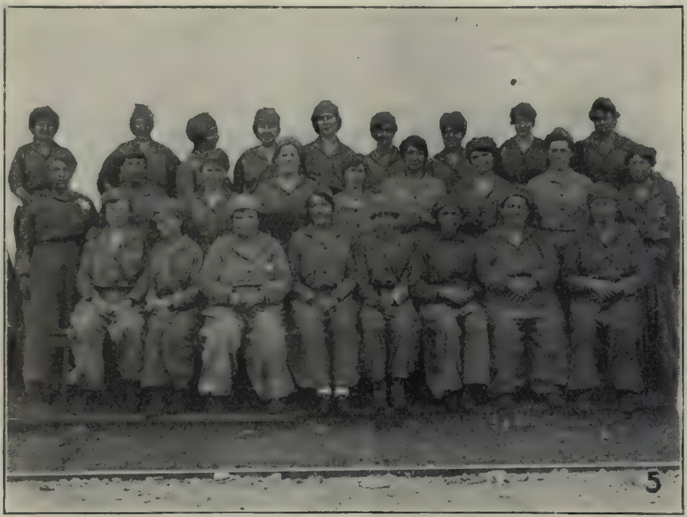
In the several general shops, where cars are brought for painting, varnishing and general repairs or overhauling, the women are used to good advantage on various classes of work. That which they have taken up most readily and which they perform in many cases better than men comprises the various cleaning operations. Before a car can be repainted all parts must be thoroughly cleaned inside and out. A great amount of this work is being done as piecework and this system is working out to good advantage both for the employees and the railway. Other duties performed by

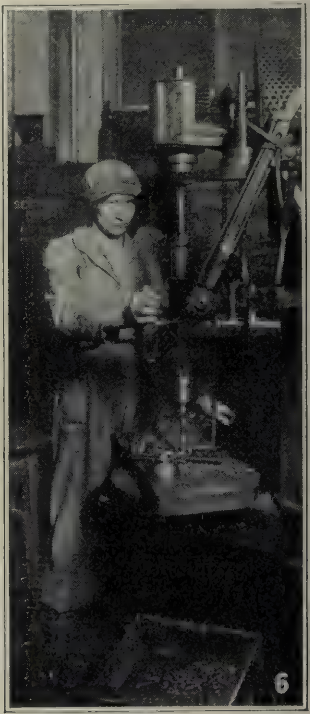


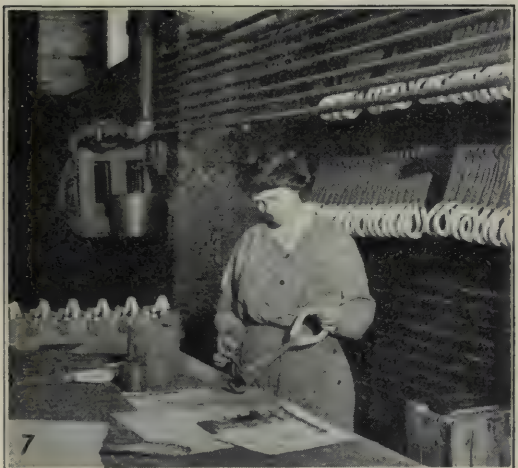


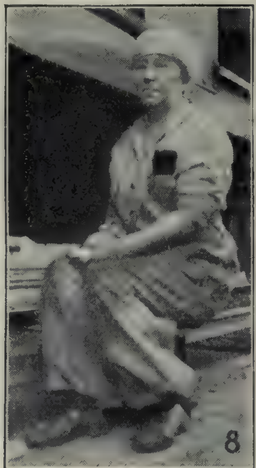












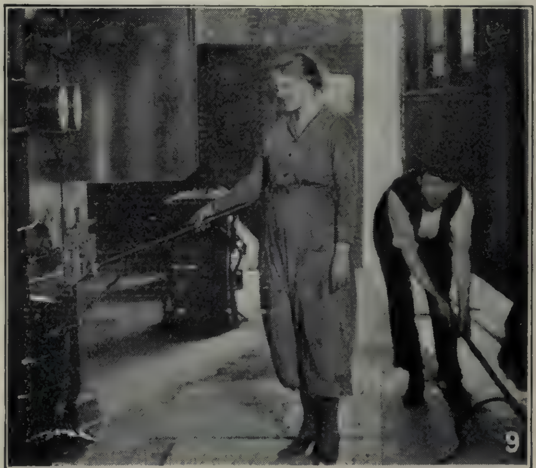


Fig. 1—Wiring master controllers and electrical portions of automatic car couplers.
Fig. 2—Machining an armature shaft.
Fig. 3—Cleaning and painting cars.
Fig. 4—Filling a broom head for a surface snow-sweeper.
Fig. 5—Women employees with regulation shop uniforms.
Fig. 6—Operating a drill-press.
Fig. 7—Cleaning and priming hand straps.
Fig. 8—Inspecting multiple-unit controllers.
Fig. 9—Assisting in making a high-potential test on car wiring and equipment.

Women Employees in the B. R. T. Mechanical Department women in the paint shop consist in removing curtains, scraping and burning off paint, re-painting floors, touching up and varnishing various parts, blacking off pipes and equipment parts, cleaning seats, painting hand straps, etc.

In addition they operate milling machines, drill presses, punch presses and boring machines. At the bench they file, chip and rivet various parts and perform any class of work not requiring a skilled mechanic. Broom heads are filled, fenders repaired, trucks are stripped for overhauling and various light repairs are made.

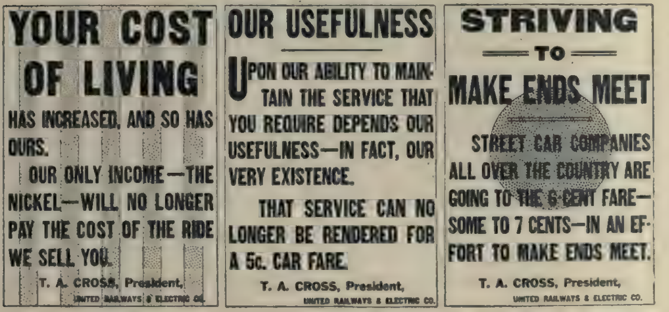
In order to comply with the recommendations of the Industrial Commission of the State of New York the railway requires that all women operatives doing shop work wear cap and overalls. These shop uniforms combine safety with comfort and are purchased by the employees at certain department stores upon order from the superintendent or foremen at a special price of $4 for the complete uniform. As a further measure to promote safety and comfort while working, the wearing of high-heeled shoes is prohibited. In order not to impose a hardship on those entering the service a period of ten days is allowed for the provision of the necessary uniform.

Free transportation over the lines of the system by use of the departmental badge is provided. One of the rules of the transportation department requires that the badge be displayed on the cap of the employee while riding on a car. In order to provide an attractive head dress for the women a trench cap has been designed for their use.

In general the class of women applying for this work is of very high grade. Many have male relatives in the employ of the railway and in one case mother and daughter are now working in the same shop.

To 800,000 Patrons in Baltimore

SINCE the United Railways & Electric Company, Baltimore, Md., filed a petition on July 19 for a reasonable increase in fare, the company in a sustained publicity campaign has been trying to drive home the fact that the public is squarely and fairly confronted with the alternative of a service which will not meet its needs or a fare increase which will be commensurate with the higher costs of doing business.


YOUR COST OF LIVING HAS INCREASED, AND SO HAS OURS.
OUR ONLY INCOME—THE NICKEL—WILL NO LONGER PAY THE COST OF THE RIDE WE SELL YOU.
T. A. CROSS, President, UNITED RAILWAYS & ELECTRIC CO.

OUR USEFULNESS
UPON OUR ABILITY TO MAINTAIN THE SERVICE THAT YOU REQUIRE DEPENDS OUR USEFULNESS—IN FACT, OUR VERY EXISTENCE.
THAT SERVICE CAN NO LONGER BE RENDERED FOR A 5c. CAR FARE.
T. A. CROSS, President, UNITED RAILWAYS & ELECTRIC CO.

STRIVING TO MAKE ENDS MEET
STREET CAR COMPANIES ALL OVER THE COUNTRY ARE GOING TO THE 6-CENT FARE—SOME TO 7 CENTS—IN AN EFFORT TO MAKE ENDS MEET.
T. A. CROSS, President, UNITED RAILWAYS & ELECTRIC CO.

POSTERS USED IN BALTIMORE IN CAMPAIGN TO SECURE RELIEF FROM EXCESSIVE OPERATING BURDENS

Some of the striking car posters used are shown in the accompanying illustration. The company also told about relief granted in other cities.

More Data on the Connecticut Company's Power-Saving Campaign

THE Connecticut Company has completed practically a year of its campaign for power savings, and data are now available showing the result. A preliminary note on this subject was printed in the issue of the ELECTRIC RAILWAY JOURNAL for June 15, 1918, page 1152.

The very substantial savings accomplished are the result of a number of factors. There has been excellent co-operation between the men and the management, not only with respect to the men on the cars but also those in the carhouses, bond maintenance men, and others. No small credit should be given to the work done to maintain the cars in the best possible condition. It will be remembered that the Arthur "power-saving recorder" is used on the entire Connecticut Company system, which totals approximately 1200 cars.

The accompanying table shows the result of the entire campaign, but some comment is necessary in order to explain the wide variation in results. On the New Haven and Hartford divisions the saving was increased by the introduction of skip stops, whereas other divisions at the time were not using the skip-stop plan. For instance, Bridgeport, which shows 22½ per cent saving, had no skip stops and was, in fact, operated practically the same as a year ago except for the power-saving campaign.

TABLE SHOWING ENERGY USED FOR TRACTION ONLY ON CARS OF CONNECTICUT COMPANY

Division	Kilowatt-Hours per Car-Mile		Per Cent Decrease
	1917	1918	
New Haven	3.147	2.563	18.56
Waterbury	4.115	4.008	2.60
Hartford	3.630	2.867	21.02
New Britain	3.088	2.826	8.48
Bridgeport	3.698	2.862	22.61
Meriden	2.795	2.200	21.29
Middletown	4.332	3.134	27.65
Stamford	3.645	3.268	10.34
Norwalk	2.862	2.308	19.36
Torrington	1.793	1.124	37.31
Derby	3.721	3.444	10.13
Average for entire system	3.498	2.875	17.81

The poor showing which was made in Waterbury, relatively to the remainder of the division, is due to lateness in inaugurating the campaign. In fact, it is only now getting under way there, but it is expected soon to bring this division into line with the others. The data given in the table are of particular interest because the Connecticut Company's lines connect four large cities and serve territory embracing some seventy smaller towns and villages, thus comprising a diversity of operating conditions. These include congested city sections, high-speed interurban service and every kind of intermediate service.

The figures given are for the month of May, 1917 and 1918. During this month in 1918 the old braking-time recorders were still in use. All recorders are now being changed over to the type showing the length of time the power is on.

The monthly magazine *Concrete* is printing in its September and October issues the paper on "Effect on Concrete of Consistency and Mixing Time," read by Duff A. Abrams at the 1918 convention of the Concrete Institute.

Freight Transportation Without Rehandling

The Bonner Rail Wagon System Aims to Reduce Cost and Time of Freight Haulage by Using Containers on Wheels Which Do Not Require Warehouse Facilities

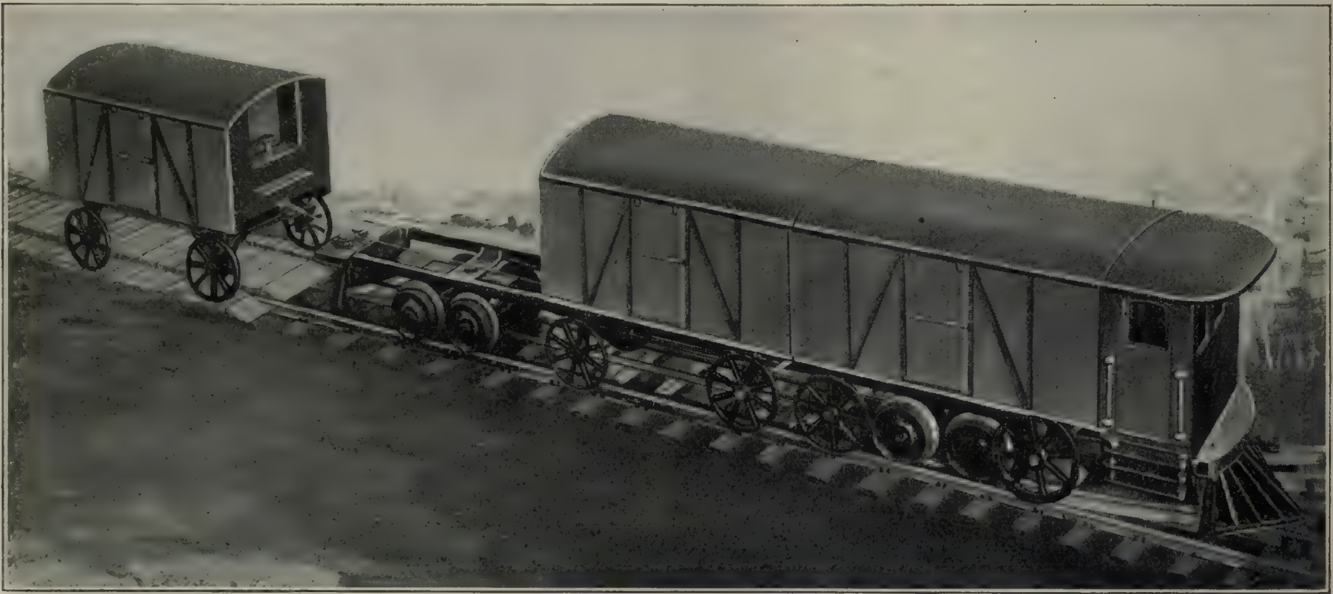
FOR the past three years much original research work has been conducted in the line of developing a new method of freight collection, rail haulage and delivery and of doing away with the rehandling of this freight while in transit. At the request of several railroad executives, a plan known as the "Bonner Rail-Wagon System" was submitted to a committee of manufacturing and operating engineers who have made a report as to the practicability of the system. This committee found the principles underlying the scheme to be sound, and recommended a full equipment and service test of the system on the lines of the Public Service Railway of New Jersey. The service recommended was for freight haulage over the Passaic line from Hoboken to Paterson, a service over the North Hudson County lines, particularly the Palisade line as far as Coytesville, with pick-up and delivery service by "auto hoss" in the various districts. In addition a service would be given from the Hoboken section to and from New York and Philadelphia.

The attention of the United States Railroad Administration was directed to this system, its co-operation solicited and after investigation and reports from engineers under its control it is now deciding the question of releasing steel and other material necessary for the carrying out of this service test. A syndicate has been organized and funds subscribed to defray the expenses of this test, and it is expected that a company to be known as the Bonner Rail Wagon Company will be incorporated later to develop the system.

The necessary transportation equipment consists of three parts. First there is the "rail wagon," a van or container for the goods to be shipped. Second there are the "carrier cars," used to transport the containers over the railroads. Finally there is the "auto hoss" for carrying containers over streets to their destination.

The "rail wagon" is constructed of steel and is mounted on four standard wheels. The body is approximately 16 ft. x 7 ft. x 7 ft. and of about 5 tons capacity. This can be either horse-drawn or motor-driven.

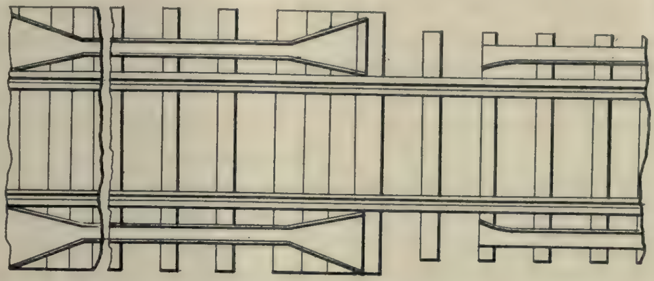
The carrier cars may be self-contained gasoline or electric motor cars, or trailers arranged for either electric or steam haulage. They will be built to master car builders standards and be capable of every needed interchangeability or service. One of these should be of dimensions such as to enable it to carry two to four rail wagons. The rail wagons are loaded astride this specially designed carrier car.


A CARRIER CAR PICKING UP A RAIL WAGON ALONG THE LINE

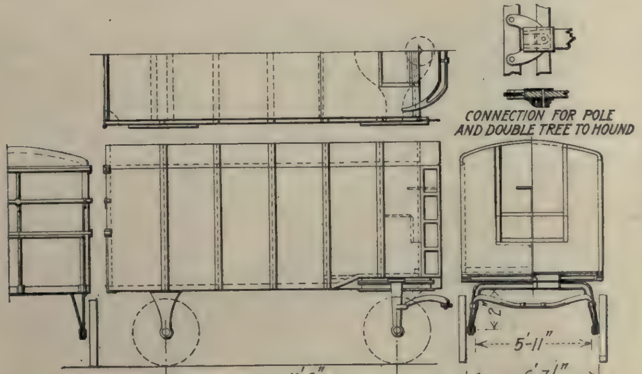
How the System Operates

The accompanying illustrations show the different classes of vehicles which enter into the Bonner plan for freight transportation. The procedure in using these consists first of loading the containers. This is done at the point where the material is manufactured or produced. They are loaded by people interested in careful handling quick and safe delivery of the material. The containers, fully equipped with wheels, can then be drawn to the nearest railroad siding or electric line by horses if desired. The weight of these loaded containers —being less than the ordinary van—can be easily handled. The "auto hoss" has been designed to provide a more rapid and efficient means of haulage where necessary. The rail wagon is left at the railway loading point to be picked up by the first carrier car available. No freight or warehouse is necessary and the handling from truck to warehouse and reloading on freight cars are avoided.

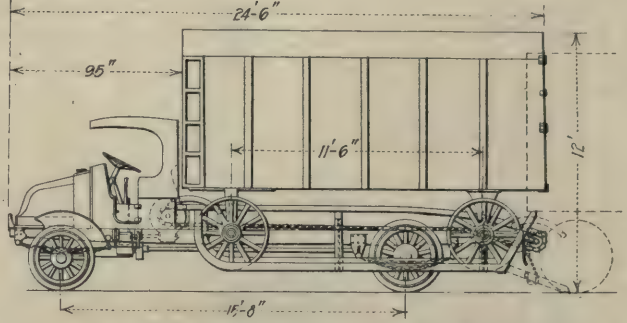
The loading of the containers for either single-car or train operation is accomplished by the motive power used for propulsion. The rail wagon has no cross axles. It is drawn astride the tracks and while resting on its wheels the carrier car is run underneath it. Air cylinders, connected to the regular source of air supply used for braking, are employed in raising the rail wagons and give the necessary clearance of the wheels from the ground for operation over the line. The containers are automatically clamped securely in place to prevent movement and are then ready for transporting. For delivery to their destination, the containers are dropped off the carrier cars either at the terminal yard or along the street or right-of-way, being lowered by the air equipment until the wheels rest on the street level, and the carrier car is withdrawn. After the carrier cars are pulled from underneath the rail wagons the latter are pulled to one side to clear the tracks. Here again no freight house is required and no additional handling of the freight is necessary. The material still in its container can then be hauled to its destination either by horses, motor tractors, or the "auto-hoss" as desired. When the "auto-hoss" is used this is, of course, available for independent work of any similar character when not used in carrying the rail wagons.



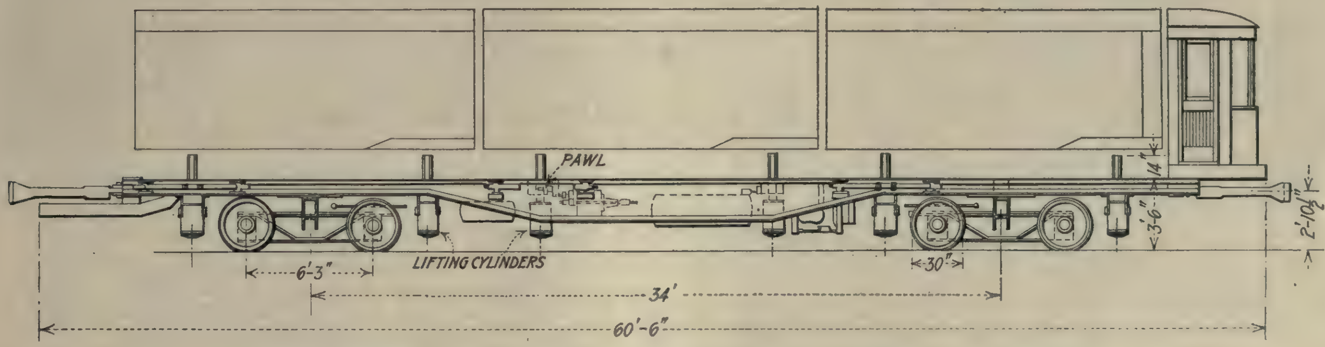
LINE-UP SWITCH FOR FACILITATING THE LOADING OF THE RAIL-WAGONS



THE "RAIL WAGON," A FREIGHT CONTAINER MOUNTED ON WHEELS



THE "AUTO HOSS" FOR RAPID PICK-UP AND DELIVERY OF THE CONTAINERS



THE "CARRIER CAR" FOR RAIL TRANSPORTATION OF THE CONTAINERS

The great advantage of this system will lie in its ability to give quick transportation without rehandling and without the necessity for freight terminals and warehouses. Congestion will be avoided and no carrier cars will be tied up waiting to be unloaded. An analysis of the present cost of freight transportation indicates that at least 50 per cent is due to the rehandling, reloading and warehouse checking necessary and that freight cars are idle twenty-two hours out of twenty-four. The rail wagon will provide for freight in less-than-carload lots and also provide a van that can be loaded anywhere in city, town or country and be delivered anywhere without disturbing the contents. Colonel Bonner's idea in this plan is to minimize cost, save time and labor, eliminate muscle power by substituting machine power and introduce system instead of confusion and disorder. Such a system ought to provide an easy means of utilizing the tracks of the electric railways for the collection and distribution of freight and as feeders to and from the steam railroads.

In the annual joint report of the express companies in the United States, just issued by the Interstate Commerce Commission, the total electric line mileage at the end of 1917 was given as 8801 as compared with 257,408 steam railroad mileage. During 1917 there was an increase of electric line mileage of 138. The Wells-Fargo & Company took over 200 more miles making its total 4431 and the Adams Express Company discontinued service over 64 miles. The other express companies reported practically no change.

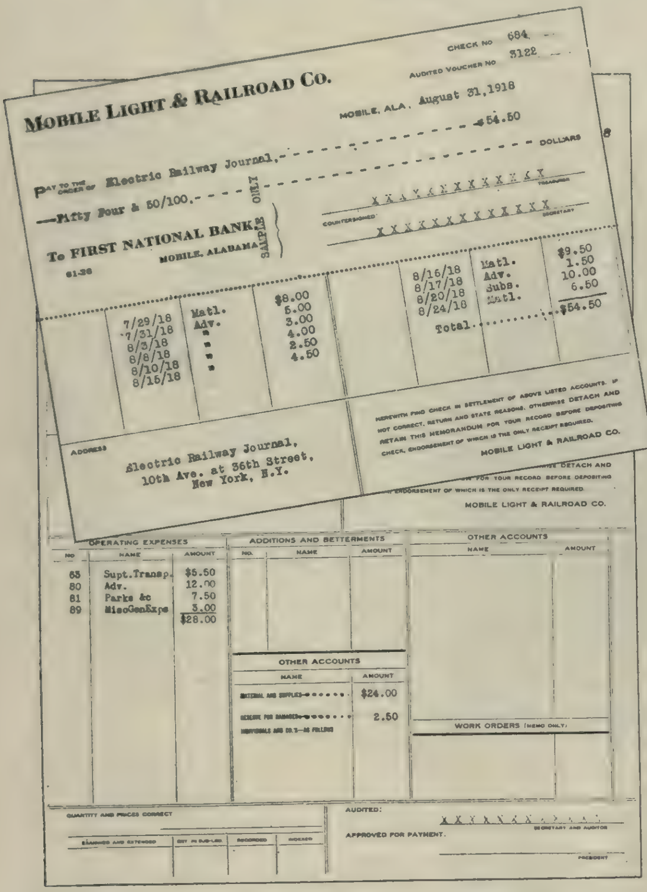
Saving Money Through Accounting

Without Impairing Efficiency, Accounting Departments Should Now Show "Productive" Power—Efficient Voucher Check Used in Mobile

BY M. W. GLOVER
Secretary and Auditor Mobile Light & Railroad Company, Mobile, Ala.

THIS war has changed the order of many things. What was considered impossible a few years ago is now the natural order of business. Possibly before the war is over the accounting department may come into its own.

A few years ago it was the rule rather than the exception to treat the accounting department as one of the necessary evils connected with the operation of a railway. Sometimes the accountant was merely a clerk in the superintendent's office with no title and less authority. If he could persuade the superintendent that certain things should be done to enable him to obtain the proper records, and it did not entail too much work, perhaps he was allowed to get the reports needed. As for permitting him, however, to issue orders as to how records were to be kept and what reports should be made, that was unheard of.



MOBILE LIGHT & RAILROAD CO.

CHECK NO 684
AUDITED VOUCHER NO 3122

MOBILE, ALA. August 31,1918

PAY TO THE ORDER OF Electric Railway Journal, $54.50 DOLLARS
—Fifty Four & 50/100.

SAMPLE ONLY

To FIRST NATIONAL BANK,
MOBILE, ALABAMA
61-26

TREASURER
COUNTERSIGNED
SECRETARY

7/29/18	Matl.	$8.00		
7/31/18	Adv.	5.00		
8/3/18	"	3.00		
8/8/18	"	4.00		
8/10/18	"	2.50		
8/15/18	"	4.50		
8/16/18	Matl.	$9.50		
8/17/18	Adv.	1.50		
8/20/18	Subs.	10.00		
8/24/18	Matl.	6.50		
Total		$54.50		

ADDRESS
Electric Railway Journal,
10th Ave. at 36th Street,
New York, N.Y.

HEREWITH FIND CHECK IN SETTLEMENT OF ABOVE LISTED ACCOUNTS. IF NOT CORRECT, RETURN AND STATE REASONS. OTHERWISE DETACH AND RETAIN THIS MEMORANDUM FOR YOUR RECORD BEFORE DEPOSITING CHECK, ENDORSEMENT OF WHICH IS THE ONLY RECEIPT REQUIRED.
MOBILE LIGHT & RAILROAD CO.

OPERATING EXPENSES			ADDITIONS AND BETTERMENTS			OTHER ACCOUNTS	
NO	NAME	AMOUNT	NO.	NAME	AMOUNT	NAME	AMOUNT
65	Supt.Transp.	$5.50					
80	Adv.	12.00					
81	Parks &c	7.50					
89	MiscGenExps	3.00					
		$28.00					

OTHER ACCOUNTS	
NAME	AMOUNT
MATERIAL AND SUPPLIES	$24.00
RESERVE FOR DAMAGES	2.50

WORK ORDERS (MEMO ONLY)

QUANTITY AND PRICES CORRECT

EXAMINED AND EXTENDED	ENT. IN SUB-LED.	RECORDED	INDEXED

AUDITED:
SECRETARY AND AUDITOR
APPROVED FOR PAYMENT.
PRESIDENT

VOUCHER CHECK AND RECORD VOUCHER USED BY MOBILE LIGHT & RAILROAD COMPANY'S ACCOUNTING DEPARTMENT

The evolution of the accounting department of steam railroads took place many years ago. The interstate commerce act had more to do with the proper recognition of the importance of railway accounting than any other one agency. Steam railway executives soon saw that their "unproductive" department was of more importance than they had imagined, and now the accounting departments of steam railroads usually have vice-presidents at their head and have no difficulty in enforcing their instructions. On the electric lines, too, the evolution of the accounting department has been progressing, and it is the exception rather than the rule for the accountant to be required to report to the head of the operating department, although this condition does exist on some lines.

ECONOMY AND EFFICIENCY THE WATCHWORDS

With the increase in authority and responsibility of the accountant, there should come a realization of the importance of practical economy and increased efficiency. The war has necessitated many changes, and every line, no matter how its earnings have increased, finds it necessary to do something to "stem the tide of rising costs" that we hear about in every line of business.

The difficulty in obtaining competent clerical help, even at increased salaries, makes it more necessary than ever to use every means of reducing the work of the accounting department. A certain amount of statistical information is absolutely necessary in every business to handle intelligently the conditions which arise, but there are many reports, not essential, which might be eliminated without any material loss. The use of mechanical devices for percentages, addition, multiplication, division, payrolls, addressing, etc., will save man-power, or rather woman-power, as man-power for clerical work is becoming a scarce article.

A TIME-SAVING VOUCHER CHECK

The voucher system is undoubtedly the best method of handling disbursements, but some voucher and check systems are so cumbersome that they cost more than they save. The accompanying illustration shows the voucher check and record voucher used by the Mobile Light & Railroad Company. It is a great time-saver. The invoices are listed below the check, the list being perforated so it may be detached before the check is banked. The address is shown in the lower left corner, and a "window" envelope is used for mailing.

The record or file voucher, made with a carbon sheet, shows the exact wording of the check and a list of the invoices together with the address. Below this duplicate section the record voucher shows the distribution of the payments and all necessary approvals. The invoices, if any, are attached to the record voucher. The making of the check and the record voucher at one operation is a great saving, and the use of the window envelopes is a measure of economy and prevents any error in addresses.

A loose-leaf or even a bound "operating expense" and "additions and betterments" ledger is better than a combination of these with the voucher record. This should contain columns for only the principal accounts. Subdivisions of certain accounts are necessary for even small roads, but sometimes this is overdone and unnecessary work results.

Statements furnished departments to enable them to know their financial results should contain all necessary information. If made too elaborate, however, they lose their efficiency, as they will probably be thrown aside or filed after a cursory glance.

Information furnished the accounting department should contain all that is necessary, but it is possible that some reports required may be eliminated without reducing the efficiency of the office.

A careful study of the work of individual clerks often results in the finding of more economical methods for routine work and in a saving of time. But efficiency must not be sacrificed to economy, and before radical changes are made results must be considered.

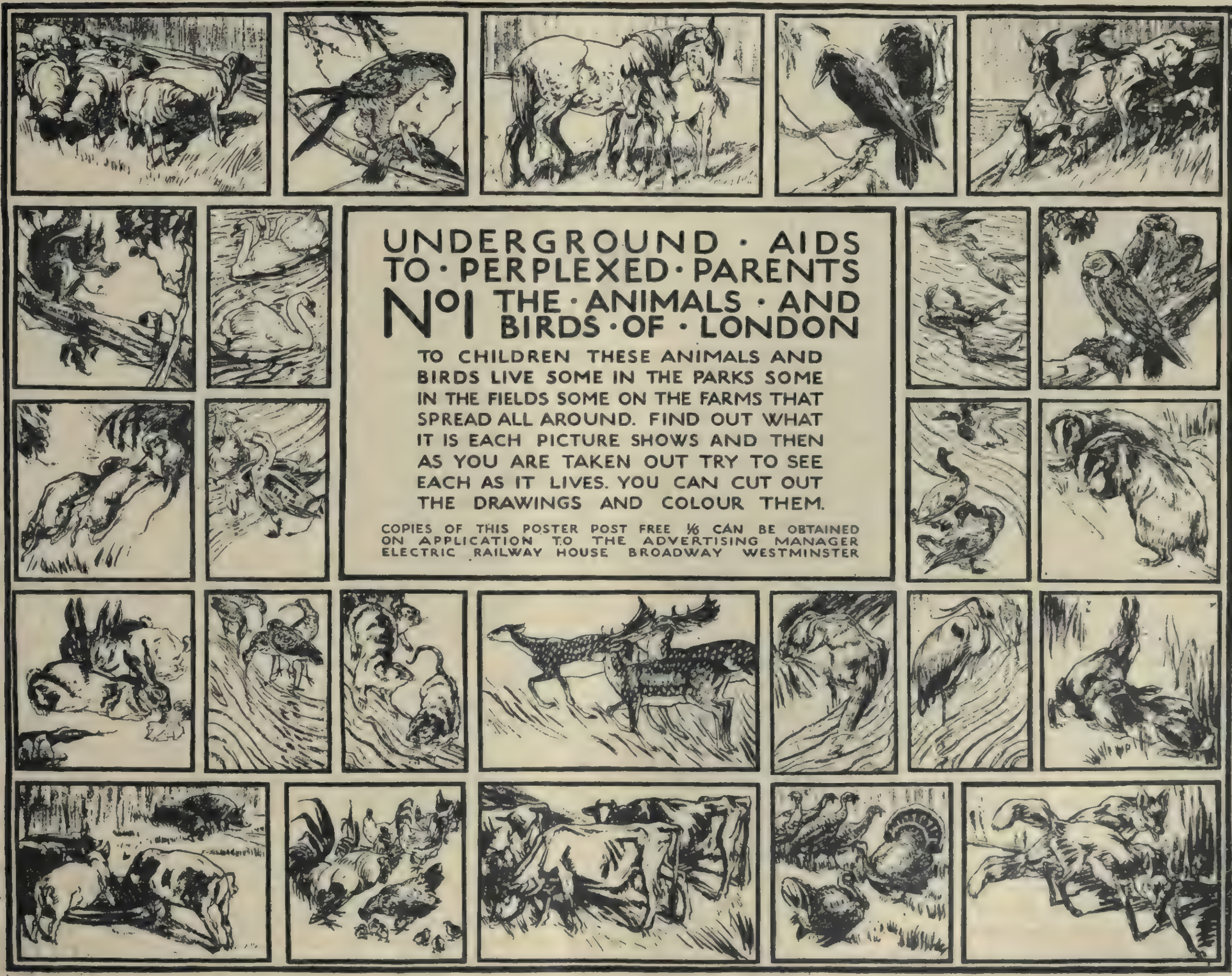
Money can be saved through the economical operation of the accounting department, but the fact should not be overlooked that money can be lost as readily if essential work is cut out in an endeavor to economize. Economy is a word very much overworked at this time. It is heard faintly in the halls of Congress and in directors' meetings, and yet often it is not thoroughly understood. It has been a well-known fact for years that municipal, state and even the national governments are run on principles far removed from economy and efficiency. Waste can be found on every hand, and electric railways must see to it that efficiency and economy are practiced as never before, but they must not sacrifice the former for the latter.

Accountants can aid materially in the program of the country for the conservation of resources, and by studying closely local conditions can institute methods of economy which will not impair efficiency and which will result in a material saving in expense. This is now absolutely necessary for the salvation of electric railways. Economical practices instituted as a war measure need not be discontinued after the war. "A dollar saved is a dollar made" should be the slogan of the accounting department, and it will not be then considered the "unproductive" department.

Only two cities of Burma—Rangoon and Mandalay—have electric tramways. The Rangoon Electric Tramway & Supply Company carried 10,860,629 passengers in 1916-1917, as compared to 10,811,406 in 1915-1916 The car mileage was 1,435,286 and 1,446,512 in the two years, and the total receipts amounted to $276,727 and $279,435. The Mandalay tramway is operated by the Burma Electric Tramway & Lighting Company. During 1916-1917 it carried 2,676,900 passengers, as compared to 2,559,101 in 1915-1916. The total mileage run was 508,960 in 1916-1917 and 502,507 in 1915-1916, while the receipts were $69,753 and $65,860 respectively.

Reduction from Large Traffic Poster, Underground Electric Railways of London

(The company also issues a leaflet, giving the names and something about the habits of these animals and where they may be seen in and around London).



UNDERGROUND · AIDS TO · PERPLEXED · PARENTS

Nº I THE · ANIMALS · AND BIRDS · OF · LONDON

TO CHILDREN THESE ANIMALS AND BIRDS LIVE SOME IN THE PARKS SOME IN THE FIELDS SOME ON THE FARMS THAT SPREAD ALL AROUND. FIND OUT WHAT IT IS EACH PICTURE SHOWS AND THEN AS YOU ARE TAKEN OUT TRY TO SEE EACH AS IT LIVES. YOU CAN CUT OUT THE DRAWINGS AND COLOUR THEM.

COPIES OF THIS POSTER POST FREE 1/6 CAN BE OBTAINED ON APPLICATION TO THE ADVERTISING MANAGER ELECTRIC RAILWAY HOUSE BROADWAY WESTMINSTER

LETTERS TO THE EDITORS

Public, If Informed, Is Fair

MILWAUKEE, WIS., Oct. 4, 1918.

To the Editors:

Houston, Tex., as this is written, seems to be getting ready to repeat Buffalo's disastrous folly with regard to electric railway fares. The Buffalo chapter is not yet all written, but it is safe to say that the community's financial loss due to several days stoppage of street-car service was many times larger than an entire year's payment of the proposed extra penny of car fare.

Houston's city commission a short time ago passed an ordinance authorizing the Houston Electric Company to raise car fares from 5 to 6 cents for adults, and from 2½ to 3 cents for children. The ordinance was passed after the city's expert investigators had reported that a fare increase was indispensable in order to permit the company to increase the wages of its employees. The Mayor and all four commissioners voted for the ordinance and signed a report to the public justifying their action.

Officers of the Houston Central Labor Council promptly began circulating petitions for a popular referendum on the ordinance. They have procured the necessary signatures, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 5, and a referendum appears to be assured. The statement that the Labor Council's hostility to the fare increase is due chiefly to the fact that the electric railway men are not members of the Amalgamated Association may or may not be correct. It is a fact that in Houston, as in Buffalo, certain political and journalistic factors which make a business of fighting public service companies have done all they could to procure the referendum.

The Houston situation is noteworthy for having brought to the front a powerful newspaper advocate of fair play for electric railway employees and investors. The Houston *Post* has published several editorials which are models of honorable and intelligent journalism.

These editorials are worthy, did space permit, to be reprinted here in full. The electric railway industry might well collect them and give them country-wide distribution in pamphlet form, as a means of arousing newspaper editors generally to their plain duty with respect to the maintenance of electric railway service under trying war conditions. The following excerpts give the essence of the *Post's* arguments:

RATES AND EFFICIENCY

Houston's welfare is wrapped up in the welfare of the street car system of the city. And the future welfare of this city depends in large part on the ability of the street car interests to supply the expanding needs of the city's growth. Furthermore, this city's financial reputation depends upon the ability of the street car company to meet the obligations which the city in the past has allowed it to assume.

Should the street car company fail to meet those obligations, the ability to sell such securities of a Houston public service corporation would be seriously impaired. Capital does not easily forget; and the record for failure to meet obligations once made becomes history.

Houston cannot get along without the street car lines, and they must be extended to meet the necessities of future growth. Already such extensions are imperative if the workers along the ship channel are to be served as they should be. No such extension can be made under present circumstances, nor will funds for them be available until the earning capacity of Houston street cars increase to the point of profits above operating expenses. Whether the increase now asked in street car fares will bring the income of the company to that point is extremely doubtful.

The company bases this request mainly upon the actual increases in operating expenses under war conditions.

No plea is made for profits.

Operators of the lines would offset the trebled costs of operation by adding 20 per cent to the fares paid them; and, so considered, the raise to a 6-cent fare is no advance worthy of the name.

Every material used in the street car lines either in repairs or extensions has increased from 200 to 400 per cent in cost. It is no mere matter of 20 per cent to them. And the company has paid the bill so far without aid from the people whom it serves.

Practically every wage earner in Houston is paid more than 20 per cent above his earnings three years ago. The street car company has been obliged to increase wages in every branch of the service. No fault was found with that necessary step. But it is not fair to ask that such increases be borne and the public not bear its proportion of the increased cost. The street car lines are asking no more than justice.

THE PROPOSED REFERENDUM

The proposed referendum may have value of an educational character, in the matter of indicating just how popular the electric railway corporation is, but it is worth absolutely nothing in so far as the real issue is concerned.

A unanimous vote of the people against an increase of rate would not settle the question of fair dealing or justice that is involved.

The matter of increasing the rate from 5 to 6 cents is one of simple justice based on ascertainable facts.

Not one voter who will vote against the ordinance granting a temporary increase will know or care a straw about the real issues. Some will vote against the increase because their living expenses are high enough already, some because they think the service is poor, some because they hate the corporations, some because they actually think the company is coining too much money, some because the electric railway service is not unionized, some for this reason or that.

How many of those signing the petition will investigate such facts as increased cost of labor, of materials, of operation? How many will care whether the company goes bankrupt or not? How many really hope it does go bankrupt?

The voter is not concerned about anything except the extra cent. Whether it be for car fare, railroad fare, beef, haircut, shave, wheat or anything else, leave it to the voter and he will say living expenses are too high now. He will vote against any and all raises with the single exception of a raise of pay for himself. That's the human nature of it. And the fare referendum will prove it.

The people did not want to pay heavier railroad fares, but the operatives of the railroads had to have more wages and it required more revenue to pay higher wages and other increased costs of operation. So the government investigated, ascertained the facts, and up went freight tariffs and passenger fares.

And the government investigated living conditions and other circumstances and now tells the Houston Electric Company to pay its men more wages—and the Lord knows they need more pay—and the company replies that it must have more revenue in order to comply with the government's request.

The City of Houston has fixed the fare temporarily at 6 cents and 3 cents in order that these wage increases may be granted.

One of the leaders of the movement to defeat the ordinance says that labor will not object to the increase if it finds that such increase is just. But who is to determine the justness of the increase?

The matter has already been investigated to the satisfaction of the Mayor and four commissioners, who have considered the real questions involved. Now it is proposed to determine the matter by those who have not investigated at all and who are not going to investigate but will vote against the company for reasons that are totally foreign to the controversy.

As a matter of fact, federal agencies ought to take over all public utilities during the war period and operate them so as to prevent injustice or bankruptcy. There is no such thing as charges that will be agreeable to the public. High or low, such charges are never satisfactory. It is seldom that service is satisfactory.

The electric railways of the whole country have been in trouble for a year; many systems are threatened with bankruptcy, and many private investors in the securities resting upon such properties are in danger of losing their holdings. There ought to be some tribunal to investigate and decide all these cases on their merits, give full justice to public and corporations alike, and obviate such absurd proceedings as attempting to decide a matter of justice, growing out of intricate conditions of which the electorate has no intelligent comprehension, through the instrumentality of the ballot box.

The *Post* may be correct in predicting the defeat of the 6-cent fare by the voters of Houston. The *Post* is curiously indifferent to the most outstanding fact of American business when it suggests the inability or unwillingness of the people to deal fairly with public service companies, after being put in possession of the controlling facts.

If the masses of the American people had become so mentally and morally incompetent as that, the whole structure of American industry and government would long since have fallen into ruins. To the contrary, the American public is on the square, and it is the most intelligent public on earth.

That the American public in the war emergency fails to deal justly with public service companies—fails even in many instances to perceive the identity of its own pocket interests with those of such companies—is in my opinion wholly and solely the fault of the companies themselvse. They have tried to do business without advertising, and the professional agitators have done their advertising for them.

My seven months advertising campaign in behalf of the United Railway of St. Louis between August, 1917, and February, 1918, provided convincing proof that even a very unpopular electric railway system, if it will come clean to the public with all of the facts concerning its rights as a business and its needs as a public service, and if it will repeat the publication of those facts often enough to make them a part of the community's common knowledge, cannot fail to get a fair and even a generous deal from the American public.

The electric railway business in the United States is getting exactly what it has coming to it, on its record of indifference to public opinion, expressed in its failure to try to win public favor as all other merchants win it. The business will get what public welfare requires that it shall get—revenues ample to pay for good service keeping pace with community growth—just as soon as it learns how to advertise as intelligently and persistently and liberally as other commercial institutions with comparable capital and volume of business.

A public service company that asks a state commission or a city council to grant it higher rates, however necessary to its solvency and to the public welfare, must be prepared to sell the rate increase to its public in advance of the order. Such a company asks more than human nature is ordinarily willing to grant when it asks public rate authorities to raise its rates and to assume the burden of public displeasure without any help on the company's part in making known the facts justifying such increase. The company that takes such an attitude is comparable to the husky beggar lying by the roadside who begs the traveler on horseback for alms, and then asks him to get down and put the gift into his hand. FRANK PUTNAM.

The Woman Conductor Should Keep Her Job After the War

CLEVELAND, OHIO, Oct. 7, 1918.

To the Editors:

A number of electric railway companies have begun the employment of women conductors and others will have to do so. Biologically, there is of course a difference between man and woman. It makes man in a physical sense woman's superior. Exclude the difference so made and equality follows, not as a figure of speech in stating a conclusion, but rather as a demonstrated fact established by woman's work in every occupation she has essayed to enter as man's competitor.

There is nothing new in this. It has been going on for a long while. On account of its slowness and yet ever-steadiness, it attracted no more than passing notice. Too often when woman has been discovered doing an exceptional job, the entire subject has been dismissed with the remark, "Oh, yes, she is a wonder, she does her work exceedingly well, but it only proves she is an exception to the rule."

Through the shortage of man-power, coming as a result of the lunacy of Germany, women in large numbers have entered fields which until now have been denied to them. The movement being one out of the ordinary has therefore not only attracted but challenged attention. It has caused talk and discussion and made for investigation with the result that woman has more than proved her right to be considered man's equal, for in all work where order, neatness and accuracy are the essentials of success she has established the fact that in many instances she is man's superior.

Woman is not taking man's place during the war but rather, through the war, is taking her own place None will appreciate this more fully than will Sammy Tommy, Jacques and Fritz when they return. They will find that they have been displaced—that the jobs they once held by reason of sex are gone, and gone forever

From what I have thus far stated, you will see that I am in favor not simply of women entering these new fields as a war necessity, but permanently holding many of the jobs she is now filling. But that is not all I am for a further displacement of man, not as a war necessity, but as a matter of plain justice to woman.

To make clear what I am driving at, let me direct your attention to what you can observe each and every day: women driving taxicabs, while men watch fare boxes; women in dirty overalls wiping dirty locomotives—men in white shirts calling streets; women changing heavy material on machines—men with machines making small change; women doing dirty jobs in clean ways—men in dirty ways doing jobs that are clean.

When the pay-enter car made its appearance, the man conductor should have made his exit. The time for the cashier was at hand. The job should have been given to her. Had this been done the chances are that the subject to-day would not have been that which it is, but in all probability would have been "the dispensing with cashiers on street cars as a war necessity."

Though the jitney was an economic waste and a transportation curse, it nevertheless proved to be a blessing in disguise, for it gave us the one-man car So the shortage of man-power is another blessing. It is giving the operator a new field to pick from and giving to woman the job which is justly hers.

To all operators who have not yet made the change which must be made, let me say, don't discharge the man at the fare box. Let him keep the job which by loyal service he rightly owns, but let all future jobs go to women. As motormen quit or are dismissed, put him on the front end. If through the change he loses his seniority, make up the difference in pay. Recognize the justice of equal pay for equal work, whether performed by man or woman. At the same time, do not fail to recognize the inequality between the front and rear end jobs. Fix the pay accordingly.

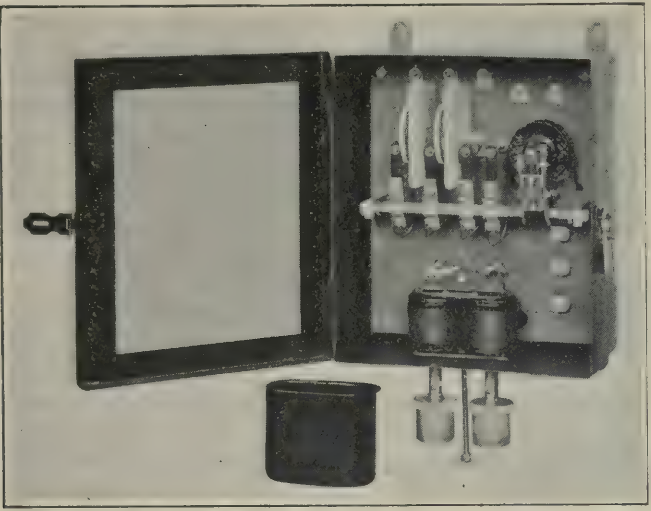
PETER WITT.

New Remote-Control Starter for Small Induction Motors

A DEVICE for starting small induction motors from remote points by throwing them directly across the line has recently been placed on the market by the General Electric Company.

The device consists of a 25-amp., three-pole contactor with two inverse-time-limit gravity-reset overload relays mounted on a slate base totally inclosed in a strong sheet-iron case.

A small "start and stop" push-button station is used as a remote-control switch. Completion of the starting circuit, by pressing the "start" button energizes the coil of the magnetically operated switch, closing the contacts, which throw the motor directly on the line. Interruption of the circuit or a radical decrease in voltage permits the contacts to reopen by gravity, thus stopping the motor which cannot start again until the "start" button is pressed.



ENCLOSED REMOTE CONTROL STARTER FOR SMALL SQUIRREL-CAGE INDUCTION MOTORS

The overload relays can be adjusted for various values ranging from normal up to 50 per cent above normal. They can also be adjusted over a wide range of time values. The relay trips automatically and resets by gravity.

The starter is known as the CR-7006 remote control switch, aranged for push-button control, and is applicable for use with motors up to and including 5 hp. 110 volts, and 7½ hp., 220, 440 and 550 volts.

Block Signal System Improvement on Pasadena Short Line

Installation of "Follow-Up" or "Permissive" Signal Facilitates Rush-Hour Movement of Trains on Congested Sections

BY CLIFFORD A. ELLIOTT

Cost Engineer Maintenance of Way Department, Pacific Electric Railway.

AN ADDITIONAL indicating lamp has been recently installed beneath the three-position automatic block signals on a portion of the Pasadena Short Line of the Pacific Electric Railway. This lamp, which has a yellow lens, is connected in series with the lamp giving the red or danger indication. With both lights burning, the train is permitted to proceed under proper control into a block already occupied by a preceding train. Previously, when a train received a red indication it was required to stop and wait one minute before proceeding.

THREE-POSITION AUTOMATIC BLOCK SIGNAL.
Small indication lamp installed underneath to allow permissive operation.

The three different indications now provided are: Green, indicating that the track is clear for two blocks ahead; yellow, indicating that the second block ahead is occupied; and red and yellow, permissive signal, incating that the first block ahead is occupied but allowing the train to proceed at reduced speed. The blocks for this section are from 200 ft. to 500 ft. in length, and many delays previously occurred, due to congested traffic conditions. Five signals on the outbound track and four signals on the inbound have been changed to the latest form.

This line uses a 2200-volt transmission system centrally fed, a substation being located 1.8 miles from the point of the beginning of the block signal system on the line. At junctions, crossovers, etc., additional signals are used to provide full protection to short cars or trains while taking crossovers.

This same method of signaling is also used by the Pacific Electric Railway on its new viaduct entering and leaving its main terminal passenger station in Los Angeles. This terminal was described in the issue of the ELECTRIC RAILWAY JOURNAL of Aug. 25, 1917, page 307. On the viaduct the permissive yellow signal is controlled from a signal tower. Normally, with a train in the block ahead the signal will show red to a following train. If conditions are such as to warrant the closing up of trains, the towerman can give the permissive indication by lighting the yellow lamp. This is so interlocked that it cannot be given except when the red light is burning.

United States Bureau of Mines, Washington, D. C., has prepared a resuscitation chart which is in poster form, 11 in. x 16 in. Copies can be secured from the Director of the Bureau of Mines, Washington, D. C.

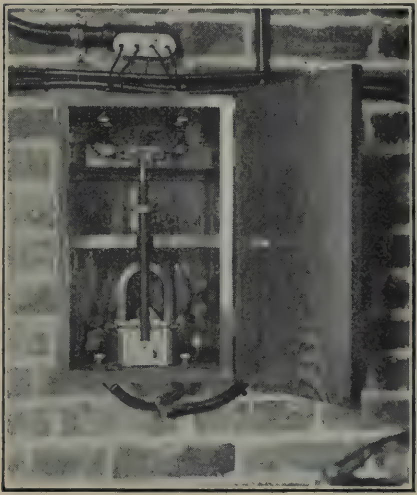
Columbus (O.) Remote Control Substation Has Several Novel Features

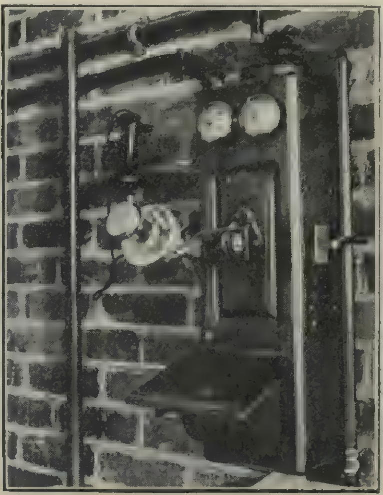
Connections for Starting and Stopping Station Over Telephone Line and Device for Advising Dispatcher of Load Condition Included

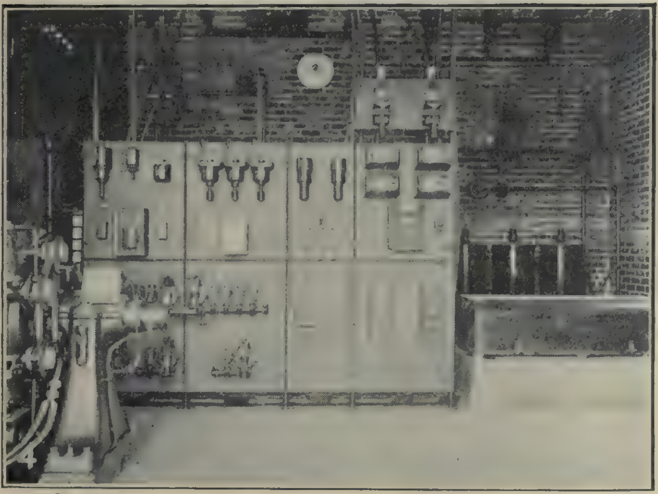
ONE of the latest automatic substations on electric railway lines is that recently put into commission by the Columbus Railway, Power & Light Company at Columbus, Ohio. This is the substation mentioned by Messrs. Linebaugh and Burnham in their paper on "Protection from Flashing" delivered before the 1918 convention of the American Institute of Electrical Engineers, which was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for July 6, page 9.

The substation contains one 500-kw. 60-cycle General Electric rotary converter and the standard auxiliary automatic control apparatus. The commutator of the rotary is surrounded by a new device for extinguishing the arc, consisting of barriers between the brushes which nearly touch the commutator surface, arc chutes to carry off any flashes that may occur and wire screens to assist in extinguishing the arcs. Details of this equipment will be found in the earlier article referred to.

When this equipment was first installed a flashover test was made by short-circuiting the trolley wire and ground feeders at a distance of about 1000 ft. from the substation by means of a pole switch. This was down several times and the rotary showed no signs of distress, the arc chutes performing their functions perfectly.







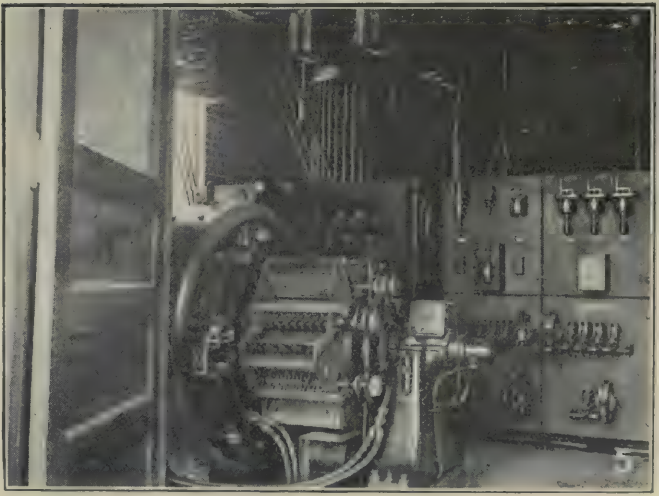


Fig. 1—Relay for use in remotely controlling the substation.
Fig. 2—Exterior view of Columbus automatic substation building.
Fig. 3—Buzzer mounted over telephone transmitter for use in indicating load on substation.
Fig. 4—Interior view of automatic substation (at left, commutator end of rotary converter and transformers; in center, switchboard and meter panels; at right, in rear, electrolytic lightning arrester; in foreground, drum controller on concrete base).
Fig. 5—Brush barriers on rotary converter.

VIEWS IN AND ABOUT THE AUTOMATIC SUBSTATION OF THE COLUMBUS RAILWAY, POWER & LIGHT COMPANY

The pictures show the general arrangement of rotary, control switchboard panels, transformer, drum controller, electrolytic lightning arrester cells, etc. Another photograph, showing the exterior of the building, indicates the extreme simplicity in housing which is possible with the automatic substation.

All substations on this property are under the control of the load dispatcher, who is located in the central part of the city. (See ELECTRIC RAILWAY JOURNAL, July 18, 1914, page 129). The dispatcher also has control of the automatic substation which, by arrangement with the telephone company, is effected over the telephone line. For this purpose a special relay was constructed by the power department, the actuating element of which is a magneto generator.

The relay is shown in one of the illustrations. It consists of the permanent field magnet and armature of the generator with a long rod of insulating material projecting upward from the latter. This rod carries a "damping" vane. At the upper end of the rod is a contact device which when in one direction permits the energizing of the substation control circuit in such a way as to start the substation and similarly causes it to be shut down when the arm is in the opposite position. Direct current for the purpose of actuating the relay is sent over the telephone line from the load dispatcher's office.

When the substation has been started by the load dispatcher it operates entirely automatically.

A very ingenious plan is used to indicate to the load dispatcher the approximate magnitude of the load on the substation at any time. This consists of a buzzer hung directly over the mouthpiece of the telephone transmitter and connected in a circuit containing a battery and a contact connection on the rotating element of the station watt-hour meter. Every time that the rotating element makes a revolution an impulse of current is sent through the buzzer, so that the frequency of rotation is clearly indicated. By listening through the telephone line, from time to time, the load dispatcher has a gage of the load upon the substation by the frequency of the "buzzes" and thus can keep himself in touch with conditions therein.

An Opportunity for Engineers

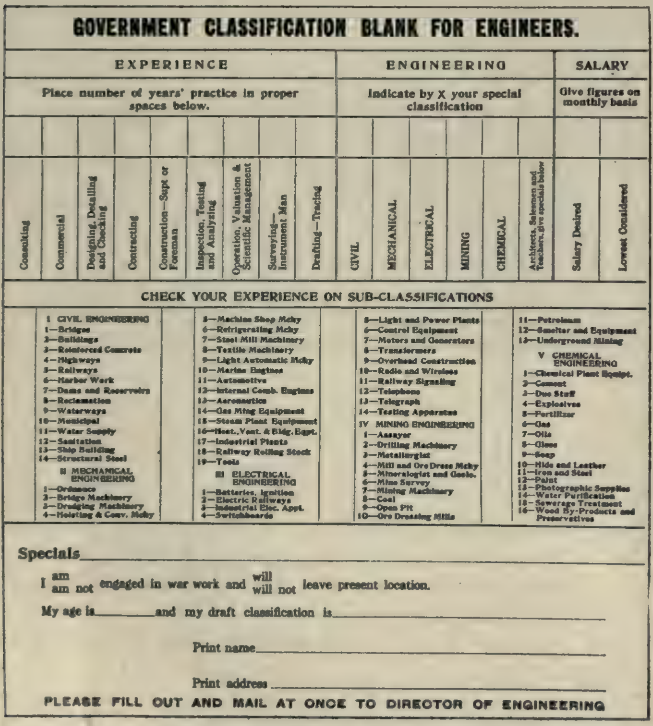
IN A RECENT issue of the ELECTRIC RAILWAY JOURNAL brief mention was made of a government classification blank for engineers, prepared a short time ago by the Division of Engineering of the United States Employment Service, Chicago, Ill. This blank has met with such universal favor that it is reproduced for the benefit of those in the railway field who are not already familiar with it.

The blank accomplishes several purposes. One is to offer a means whereby engineers may place themselves on record with the government regardless of whether they now desire employment with the government elsewhere or not at all. Instead of being obliged to make application through an employment agency at considerable expense, it can be done in this way through the newly organized Division of Engineering, free of charge. The blank remains on file, and if at any future date the engineer desires employment, no further application or expense is necessary.

Second, the blank serves as a means of classification of the enginers of the country. The arrangement is clear and concise and has so definitely divided the various branches of engineering that it tells at a glance the qualifications of the registrant. If either the government or private employer is in need of a man of certain qualifications and training, this file of records shows just where he can be obtained. Thus at one and the same time the engineer has an opportunity to render himself a service by placing himself in a position to secure employment at desire and to perform a patriotic service to the government by placing his qualifications on record with the Division of Engineering.

In the light of the recent draft it might be wise for engineers subject to call to consider this blank seriously. Although it is not reported that any arrangements have been made to use this classification as an aid to induction into service, it is only logical to assume that the government might use such a valuable record to assist in placing men where they are best fitted to serve the country.

Application for the blank can be made at any local United States Employment Service office or direct to to the Director of Engineering, 29 S. La Salle St., Chicago, Ill.



GOVERNMENT CLASSIFICATION BLANK FOR ENGINEERS.

EXPERIENCE									ENGINEERING						SALARY	
Place number of years' practice in proper spaces below.									Indicate by X your special classification						Give figures on monthly basis	
Consulting	Commercial	Designing, Detailing and Checking	Contracting	Construction—Supt or Foreman	Inspection, Testing and Analyzing	Operation, Valuation & Scientific Management	Surveying—Instrument Man	Drafting—Tracing	CIVIL	MECHANICAL	ELECTRICAL	MINING	CHEMICAL	Architects, Salesmen and Teachers, give specials below	Salary Desired	Lowest Considered

CHECK YOUR EXPERIENCE ON SUB-CLASSIFICATIONS

I CIVIL ENGINEERING
1—Bridges
2—Buildings
3—Reinforced Concrete
4—Highways
5—Railways
6—Harbor Work
7—Dams and Reservoirs
8—Reclamation
9—Waterways
10—Municipal
11—Water Supply
12—Sanitation
13—Ship Building
14—Structural Steel

II MECHANICAL ENGINEERING
1—Ordnance
2—Bridge Machinery
3—Dredging Machinery
4—Hoisting & Conv. Mchy
5—Machine Shop Mchy
6—Refrigerating Mchy
7—Steel Mill Machinery
8—Textile Machinery
9—Light Automatic Mchy
10—Marine Engines
11—Automotive
12—Internal Comb. Engines
13—Aeronautics
14—Gas Mfng Equipment
15—Steam Plant Equipment
16—Heat., Vent. & Bldg. Eqpt.
17—Industrial Plants
18—Railway Rolling Stock
19—Tools

III ELECTRICAL ENGINEERING
1—Batteries, Ignition
2—Electric Railways
3—Industrial Elec. Appl.
4—Switchboards
5—Light and Power Plants
6—Control Equipment
7—Motors and Generators
8—Transformers
9—Overhead Construction
10—Radio and Wireless
11—Railway Signaling
12—Telephone
13—Telegraph
14—Testing Apparatus

IV MINING ENGINEERING
1—Assayer
2—Drilling Machinery
3—Metallurgist
4—Mill and Ore Dress Mchy
5—Mineralogist and Geolo.
6—Mine Survey
7—Mining Machinery
8—Coal
9—Open Pit
10—Ore Dressing Mills
11—Petroleum
12—Smelter and Equipment
13—Underground Mining

V CHEMICAL ENGINEERING
1—Chemical Plant Equipt.
2—Cement
3—Dye Stuff
4—Explosives
5—Fertilizer
6—Gas
7—Oils
8—Glass
9—Soap
10—Hide and Leather
11—Iron and Steel
12—Paint
13—Photographic Supplies
14—Water Purification
15—Sewerage Treatment
16—Wood By-Products and Preservatives

Specials____________________

I am / am not engaged in war work and will / will not leave present location.

My age is________and my draft classification is__________

Print name____________________

Print address____________________

PLEASE FILL OUT AND MAIL AT ONCE TO DIRECTOR OF ENGINEERING

GOVERNMENT CLASSIFICATION BLANK FOR ENGINEERS

Skip-Stop Signs in Brooklyn

IN ACCORDANCE with the request of the Fuel Administration Brooklyn has adopted the skip-stop plan, and the new method of operation will be put into effect as soon as a sufficient number of stopping places can be marked. The company submitted its proposal for establishing skip stops on the various lines of the system to the Public Service Commission last spring, but it was not until almost the last of September that approval was given. The plan provides for marking the various locations at which cars will stop by signs painted on the poles of the line.

The work of marking the poles was started immediately upon obtaining the commission's sanction, and as fast as the poles of each line are marked by the employees of the line department the plan has been adopted on that line.

The poles are marked with a white band 12 in. wide and painted just under the lowest joint of the pole. Upon this band is stencilled one of the words, either "stop" or "station," depending respectively upon whether the cars are to stop at that point without signal or only upon signal by intending passengers. As pure white paint will not show up so clearly or last so long on black poles as will some other colors, the color is blended with a slight amount of yellow. The words "stop" and "station" are stencilled vertically on the poles and placed on the two sides at right angles with the curb line so as to be seen easily by persons walking on the sidewalk and approaching the pole.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Labor Jurisdiction Denied

War Labor Board Holds Men Have Not Exhausted Means of Settlement Provided in Their Contract

Messrs. Taft and Walsh, joint chairmen of the National War Labor Board, on Oct. 2 denied jurisdiction in the case of the Birmingham Railway, Light & Power Company, Birmingham, Ala. In this case the employees sought increased wages and the company contended that the National War Labor Board did not have jurisdiction, because the agreement between the company and the Amalgamated Association specifically provided a means of settlement which the employees had not invoked. The decision of the joint chairmen sustains the contention of the company. It is of importance to all companies having agreements with their employees which provide for a method of settlement. Chairman Taft said:

CHAIRMAN TAFT QUOTED

"The section has come to a conclusion with respect to the case of the Amalgamated Association against the Birmingham Railway, Light & Power Company. We have concluded that it is our duty, under the principles applying to the board as set out in the proclamation of the President, to hold that the plea to the jurisdiction here is good—without going into other grounds or without discussing the merits of the other grounds—upon the ground that the contract offers an opportunity to either party to invoke a conventional tribunal, and that the complainant party has not invoked that tribunal. That comes within the letter of the rules excluding our jurisdiction. For that reason the complaint will be dismissed.

A TRIBUNAL OF CONCILIATION AND MEDIATION

"Our view in respect to the jurisdiction of this tribunal has been expressed once or twice. This is primarily a tribunal of conciliation and mediation. The power to intervene by mediation is one that is not limited exactly by the attitude of the persons with whom the mediation is undertaken. If we approach them, their attitude of resistance to our solicitations or suggestions or advice may not prevent our going on and looking into the merits of the question so far as we may, and making recommendations or suggestions. A mediator may visit a man in his office, and may continue his mediation until he is shown the door.

"But where we proceed to arbitration, the question is a different one. Here we are asked to go ahead and act in this matter as a section of the board which may proceed to arbitration, and here we find the facts to fit exactly the clause of our jurisdiction which excludes it.

COMPLAINT DISMISSED

"Therefore, the order will be that the complaint be dismissed, on the ground that the parties have not taken the course set forth in the contract."

New York Staggers Hours

Railways, Business Men and Merchants Quick to Comply With Health Board Order

In order to lessen crowding during the prevalence of the influenza in New York City, the Health Commissioner issued an order during the latter part of the week ended Oct. 5, in which he proposed staggered hours for business.

CONGESTION DIMINISHED

Reports received on Oct. 8 by the Public Service Commission showed that the order regulating the opening and closing of offices, factories, and theaters had diminished congestion on the traffic lines in the late afternoon and night, but had shown no apparent effect upon morning travel. Both on the Interborough and the so-called New York Consolidated systems, the latter including Brooklyn lines, only slight changes were noticeable in the morning of the first day's tryout, but in the afternoon both companies experienced unusually heavy riding between 4.30 and 5 o'clock.

Full rush-hour service was begun on the afternoon of Oct. 7 on the lines of both the Brooklyn and the New York City systems at 4.30 o'clock. The opinion of the Health Commissioner on Oct. 7 was that the order was being pretty generally observed, but to insure that it should be carried out he asked the active co-operation of the Police Department.

More Liberty Bonds Mean Permanent Peace

"I SHALL MAKE THE PEACE TERMS! WHEN I AM READY"
4TH LIBERTY LOAN

SUPPOSE you had a small farm, a nice little wife and perhaps a growing family, and you wanted nothing in this world more than to be let alone and to live your life out just as God had ordained.

And then suppose that some armed force, which you had never had occasion to consider, suddenly invaded your land, killed your stock and then demanded that you get out. And then suppose that your young son resented this foreign intrusion and that the helmeted brutes, just to show their militaristic power, jabbed a bayonet through his chest. Then suppose the murderers took away for their own purpose the little maid whom you begot!

Would you spend a nickel for a cartridge to kill one of those despoilers? Or, if these things had come to you, would you not rather forget the price of a single cartridge, which might kill only one, and save until you could buy a bond that would kill fifty?

If you lend your country a hundred dollars, you are approaching one hundred dollars nearer world democracy, which means the equality of men.

The Hun is beginning to whine, but this is no time to stop fighting if permanent peace is to be secured.

Then act at once! Buy More bonds of the Fourth Liberty Loan!

Buffalo Strike Still Unsettled

All Efforts Fail to End Controversy in Which Wages and Fares Are Involved

Platform men employed by the International Railway, Buffalo, N. Y., who went on strike at 4 a. m. on Oct. 3, say they will not return to work unless they receive the wage award of the War Labor Board. This provides for a sliding scale of 43 to 50 cents an hour. In addition the men demand back pay based on this schedule dating from June 1, last.

All of the local and interurban lines of the company in Buffalo, Niagara Falls and Olcott are tied up by the strike. The company has been operating about a dozen cars on some of the downtown lines so as to comply with its franchise. They are being run by traffic supervisors. The strikers have not sought to prevent the operation of these cars. There has been no disorder.

RAILWAY WILLING BUT IMPOTENT

The railway has agreed to pay the wage award of the War Labor Board and has also tentatively agreed to pay the men their back salaries based upon the award from June 1, last, but owing to the restrictions of a 5-cent fare E. G. Connette, president of the company, says that it is financially unable to give the men this wage increase which would amount to approximately $1,750,000 a year. The company asks the City Council to enact an emergency ordinance, allowing the collection of the 5-cent fare until a just and equitable rate is fixed by the Public Service Commission for the Second District. This emergency ordinance would not be subject to a referendum of the voters the same as the first 6-cent fare ordinance adopted by the Council and later rejected five to one by the voters.

Members of the Buffalo Retail Merchants' Association arranged a conference with the publishers of the city's newspapers and it was agreed at that conference that it is essential to the best interests of the city that the Council enact an emergency ordinance which would allow the railway to charge a 6-cent fare until a reasonable and just fare is fixed by the Public Service Commission. A special meeting of the Council was then held. Two members of the Council opposed the measure and one of these votes is needed to secure its enactment. As the railway has agreed to pay the wage award to its men if this ordinance is enacted, this would end the strike.

Newspapers which have been bitterly opposed to the International Railway now apparently see the folly of continuing the fight against a higher fare, especially in view of the fact that the company must have a higher fare if it is to pay the award of the War Labor Board and resume the operation of its cars. These newspapers are now assailing the two members of the City Council for not changing their attitude.

The two opposing members of the City Council, one of whom is the Mayor, who incidentally was elected on the platform of street railway reform and a 4-cent fare, have appealed to the Attorney General to bring an action against the railway to end the corporate existence of the company and apply to the courts for the appointment of a temporary receiver. This litigation is now pending.

After a long conference on the third day of the strike members of the City Council, representatives of the Chamber of Commerce, E. G. Connette president and other representatives of the International Railway, tentatively agreed upon a proposition which, it was believed, would bring an end to the strike, but the agreement was rejected by the board of directors of the railway. This agreement contained these conditions:

SETTLEMENT BASIS STATED

The Council to nominate a managing director, also a treasurer of the International Railway, subject to the approval of the board of directors.

The Council to have the right to nominate a majority of the board of directors. By-laws to be so amended that on questions concerning the creation of bonded debt or the sale of property, two-thirds vote of board necessary.

The Council to submit to the Public Service Commission the question of a reasonable fare during the period of the war and six months after peace.

No dividends to be paid on the preferred stock or the common stock of the railway until the determination of a fair rate of return by the Public Service Commission.

Valuation to be as of June 30, 1915, and actual cost of betterments made since.

The agreement reached between the company and the City Council—which would end the strike if one more member of the City Council casts his vote in favor of it—provides that the Council pass an ordinance stating that it is "immediately necessary for the preservation of the public peace, health and safety," which would provide that pending the determination by the Public Service Commission, of a reasonable rate of fare, the Council consents to a rate of fare of 6-cents and to such action by the Public Service Commission as is necessary to put such temporary increased fare into effect.

Pending the determination of what is a reasonable rate of fare it is proposed that the company shall give to each passenger paying a 6-cent fare a rebate slip for 1 cent, to be redeemed if the Public Service Commission holds a 5-cent fare is reasonable and just. The railway is also to elect a majority of the board of directors of the company as named by the Council, who shall serve during the life of the agreement. The Milburn agreement, which covers the franchises between the city and the railway, is not to be changed or affected except as temporarily provided for.

Application has already been made by the municipal authorities before Justice Louis B. Marcus in the Supreme Court of Erie County for a writ of mandamus to compel the International to operate its cars on the city lines. Members of the City Council say that if the writ is issued, the court may appoint a receiver or officer to see that the provisions of the writ are carried into effect.

The strike resolution of the company's employees demanded an increase in wages of all platform employees to the scale recommended by the War Labor Board, which is from 43 cents to 50 cents an hour. Wages of other employees, including shopmen, electrical workers, women car cleaners, etc., would be increased by the same percentage, provided, however, that if this percentage increase does not bring the minimum wage up to 42½ cents an hour, these employees are to be paid this minimum scale per hour. This scale would continue in effect until Feb. 1, 1919, and under the award of the War Labor Board the men could apply to the board for a readjustment in wages every six months thereafter if conditions warrant such a move. The men also demand back pay amounting to a total of approximately $300,000 based upon the award of the War Labor Board dating back to June 1, last.

Government representatives who were sent to Buffalo brought word from the War Department and the War Industries Board that there would be no federal intervention in the Buffalo situation. The day before the strike was called, W. D. Mahon, international president of the Amalgamated Association, held a conference with federal authorities in Washington and the government agreed to pay the difference between the present wage scale of the men and the award of the War Labor Board for a period of one week so as to prevent a cessation of the city's transportation facilities and consequent crippling of the industries engaged on war work. Within a few hours after this offer was made, it was withdrawn by the government.

On the night that the strike was called all of the business interests of the city and representatives of the International Railway and representatives of the union conferred in the Chamber of Commerce. At that time the businessmen of the city offered to subscribe a total of $75,000 to loan the company so as to pay the difference between the men's pay and the award of the War Labor Board for a period of one month so that some steps could be taken in the meantime to prevent a strike. The union delegates rejected the offer because no provision was made for receiving the back pay based on the award of the board.

Signal Corps Opportunities

Special Call for Graduate Electrical Engineers Experienced in Power or Communication Work

At the present moment there is a shortage of officer candidates having the required technical and personal qualifications available for signal corps officer training schools. While ordinarily officer candidates are taken from the enlisted personnel of the Signal Corps, a much smaller number having the necessary qualifications are available than are required. For this reason it is desired to secure by voluntary induction, for assignment to an officers' training school during the next two months, the services of a considerable number of electrical engineers who are available for full military duty, and who are between the ages of twenty years and nine months and forty-five years.

SIGNAL CORP SEPARATE

The United States Army maintains a signal corps as a separate organization. At present its duties are twofold; first, it is charged with the duty of developing and producing signal apparatus for the mobile army, for the air service, and for the coast artillery corps. Its second and principal duty is that of maintaining communication within the mobile army and along lines of communication. For this purpose two kinds of signal troops are employed; first, the so-called telegraph battalions which install and operate telephone and telegraph lines in the rear of the army. Second, the field signal battalions are organizations for service with combatant troops.

In view of the technical nature of the duties of signal officers, the most suitable candidates for commission as such are electrical and radio engineers who have had experience in power or communication work. Graduates of four-year courses in electrical engineering, are regarded by military authorities as ideal candidates for commissions in the signal corps.

COMMISSIONS FOR THOSE WHO QUALIFY AS LIEUTENANTS

It is desired by the signal corps to receive applications for service from men who are qualified as outlined in the preceding paragraph. Such men will be individually inducted into the army and assigned as enlisted men to an officer candidates' training school, which is now being maintained by the signal corps. Those who have shown by their record that they are officer material will either be commissioned in the grade of second lieutenant at once or assigned to a course of further military instruction as officer candidates at a signal corps camp. Those who do not qualify as officer candidates will remain in the army in an enlisted grade and will be assigned to an organization of the signal corps.

Promotions in the army are now made by selection rather than by seniority and the well qualified engineer need have no fear that his claims to promotion will not be recognized because some younger and less competent man outranks him with respect to the matter of length of service.

APPLY TO THE CHIEF SIGNAL OFFICER

Electrical and radio engineers who desire active service in the army with an opportunity to secure a commission should fill out an application for service blank which may be secured from the office of the Chief Signal Officer, Training Section, setting forth completely their military status, together with their experience and training. On being accepted for service, they will be inducted into the army in the grade of private and sent to an officers' training school with such prospects as herein outlined.

May Reject St. Louis Settlement

The United Railways, St. Louis, Mo., through its president and general manager, Richard McCulloch, will reject the thirty-one-year franchise settlement bill recently passed by the Board of Aldermen. Mr. McCulloch on Oct. 4 notified Mayor Kiel that the company would formally decline to accept the bill following a meeting of the directors on Oct. 8. Mr. McCulloch was quoted by the newspapers in part as follows:

"I was never enthusiastic about the ordinance. In the negotiations with the city we were traded out of about everything we really wanted. The company never had any great interest in the bill as finally passed.

"Negotiations with the city for the framing of a franchise ordinance were begun about two years ago. Since then conditions have changed greatly. We feel now that it would be no use for us to accept any ordinance which fixes a flat rate of fare. The rate of fare should automatically go up or down according to the increase or decrease in the earning power of the company. It has been demonstrated that under present conditions the company cannot pay its operating expenses, fixed charges and the salaries demanded by its employees at the flat 5-cent fare fixed in the ordinance.

"The ordinance named certain conditions in which the company was to be refinanced and gave the company a year in which to comply with these conditions. Under present circumstances it would be impossible for the company to do this financing.

"We suppose the next step after our rejection would be for Mayor Kiel to ask the Board of Aldermen to repeal the bill. That would open the way for new negotiations between the city and the company for the framing of an ordinance providing for a sliding scale of fares and giving the city the right to acquire the company's property under certain conditions."

The rejection of the bill would, of course, do away with the necessity of holding a referendum election on the ordinance.

New York Lines Need Money

Commissioner Whitney Suggests Surrender of Private Control—Mayor Wants Franchises Investigated

In a statement issued on Sept. 29 Travis H. Whitney, of the Public Service Commission for the First District of New York, discussed the surface railway transportation situation in that city. He expressed the belief that the increased costs of operation must be met either from increased fares or from taxes. In his opinion a change must speedily come if the service is to be even fairly adequate, and it should be radical enough to give the city greater control of the lines. He offered this suggestion:

"The free grant of the right to charge an increased fare should have public consideration. There should be a surrender by the companies of at least some of their rights as private companies—that is, a greater participation by the public in the direct management of the properties and not merely regulation, with all the legal refinements and delays that may be thrown around an order that a company does not wish to obey.

"Such public participation may take the form of municipal ownership and either municipal operation or operation by lease from the city; or by boards of directors made up in part of men appointed by public authorities; or by payment to the city of a share of the revenue arising from increased fares after necessary expenses are met, including increased wages necessary to procure adequate service, and with a joint board to administer the revenue.

OWNERS ANXIOUS TO SELL

"The owners of utilities in this city no longer oppose municipal ownership. The city faces the dangerous possibility that under the pressure of war necessities the advocates of municipal ownership and the needy owners of utilities will unite to burden the city with utilities, good, bad and insolvent, useful and useless, under agreements that will gratify public officials by promoting their political success and will bring the owners prices for which they will be duly grateful.

"This dangerous possibility should not stand in the way, however, of the city's acquiring upon sound terms surface lines that can properly be made integral parts of the city's rapid transit systems, either to collect and distribute passengers in outlying districts to and from rapid transit terminals or in handling short-haul passengers in central districts by transfer."

Mayor Hylan on Sept. 30 directed Corporation Counsel Burr to investigate all of the electric railways in New York City in order to discover whether they are living up to their franchise obligations.

Theodore P. Shonts, president New York Railways, operating surface railway lines, has offered to assist the investigation.

Boston and Providence Wage Findings

The War Labor Board announced on Oct. 3 that wage increases had been granted the employees of the Boston Elevated Railway and the Rhode Island Company, Providence, and also that recommendations had been made that these companies be permitted to increase their fares in order to meet the wage increases.

The award in the case of the Boston company becomes effective as from June 15 last and gives surface line motormen and conductors a wage from 43 to 48 cents an hour, while those on elevated lines will receive 45 to 50 cents.

On the Rhode Island Company lines the motormen and conductors will receive from 43 to 48 cents an hour, with a minimum wage of 42½ cents for other employees, effective from July 19 last. The wage increase on this line also affects women employees.

News Notes

Wages Advanced In Bridgeton.—The Bridgeton & Millville Traction Company, Bridgeton, N. J., has granted an increase of pay to its car crews, beginning on Oct. 1, the maximum being set at 33 cents an hour.

Wilmington Wage Dispute to Board.—Both the Wilmington & Philadelphia Traction Company and its employees have agreed that the matter of wages in dispute between them shall be submitted to the War Labor Board for settlement.

Strike at Springfield.—Employees of the Springfield (Ohio) Railway struck on Sept. 23, because the company refused to recognize Organizer Al. Jones of Cincinnati as a member of the employees' conference committee. People were compelled to walk back and forth to work and business. It is said that the employees will also ask a material advance in the wage schedule.

San Francisco-Oakland Resettlement.—The City Council of Berkeley, Cal., has been asked in a formal application from the San Francisco-Oakland Terminal Railways to adopt the resettlement franchise as agreed upon by the resettlement franchise commission. The request is in accordance with the terms of an amendment to the city charter adopted at an election a year ago authorizing the Council to adopt such an ordinance. After adoption by the Council the ordinance will have to be ratified by a vote of the people before it becomes effective.

Accident in New York.—A train of empty cars southbound on the elevated extension of the subway on Oct. 3 halted not far from Brook Avenue, the Bronx, to allow for switching, about 5 a.m. The passenger-filled train following stopped behind it at the Jackson Avenue station. While the two trains were stopped a local train which left 180th Street bound for South Ferry, ran by the signal at the north end of the Jackson Avenue station and crashed into the train ahead. Two persons were killed and about twenty-eight were injured.

Higher Wages in Houston.—The new wage scale of the Houston Electric Company, granted at the time the increased fare was permitted, went into effect on Sept. 26. Motormen and conductors are now paid 38 cents an hour for the first three months, 40 cents an hour for the next nine months, and 42 cents an hour after one year's service. For the operation of one-man safety cars, the scale will be: First three months, 42 cents an hour; for three months' service or more, but less than one year, 44 cents an hour; for one year or more, 46 cents an hour. The increase in wages will amount to $109,000 a year.

New Officers for Oklahoma Association.—New officers have been elected for the Gas, Electric & Street Railway Association of Oklahoma as follows: J. F. Owens, president; C. S. Thompson, first vice-president; J. W. Shartel, second vice-president; F. G. Tappan, assistant secretary; F. D. Insull, C. H. Kretz, J. F. Owens, J. C. Resler, F. D. Shaffer, J. W. Shartel and C. S. Thompson, directors. The Oklahoma Public Utilities Bureau, which is affiliated with the association, has as its chairman J. W. Shartel and its secretary H. A. Lane. In view of the problems now confronting the utilities it is proposed to make the association much more active than it has been in the past.

Columbus to Have Memorial Building.—The Columbus (Ohio) Exposition Company, which had planned to erect an exposition building in connection with the Columbus Depot Company's interurban station at the corner of High and Rich Streets, has decided instead to erect a magnificent structure which will stand as a memorial to the American boys who gave their lives in France and in grateful remembrance of those other thousands who fought there for the freedom of the world. A full square has been secured for the buildings. The depot company had already sold $324,000 in stock, but the declaration of war delayed the construction of the building. The money paid on the stock has been invested in Liberty Bonds.

Aiding Selective Service Men.—For the purpose of assisting the employees of the United Railroads of San Francisco in filling out their questionnaires under the selective service act, W. M. Abbott, general attorney of the company, has organized a bureau which is open from 9 a. m. to 9 p. m. (Sundays excluded). All of the assistants and attendants have been sworn in as associate members of the Legal Advisory Board and are therefore authorized to administer the oath to the men and their dependents, and likewise to the foremen or executive heads. If any department collects its men and their dependents at the place of work, the bureau sends out an assistant, thus avoiding the loss of time by the men. This does not apply to the platform men, who must come to the central bureau. The men leave their questionnaires with the bureau, which sees that they are delivered to the respective draft boards within the required time. This saves the men the time and trouble of making the extra trip to file the questionnaires.

Case Against Cincinnati Commission Dismissed.—By sustaining the demurrer of City Solicitor Saul Zielonka, Judge A. K. Nippert on Oct. 2 dismissed the case brought against the Cincinnati (Ohio) Rapid Transit Commission by Attorneys John C. Rogers and Eli Frankenstein to prevent the issue of $80,000 of bonds to pay for preliminary work on the proposed municipal rapid transit line. The court held he had no authority to inquire into the manner of spending the money, that being within the discretion of the commission. He also ruled that promises made for campaign purposes are not binding, as the resolution carrying them may be rescinded at any time. This referred to the understanding that no money would be spent until the plans for the loop had been completed and passed upon by the voters. Attorney Rogers has now asked the city solicitor to bring suit to enjoin the amended franchise to the Cincinnati Traction Company, which went into operation recently. It is contended that the ordinance contains many illegal features, among which is the sliding scale of fares. Mr. Rogers declares that the features attacked are in contravention of the terms of the Rogers law, under which the revised ordinance was passed.

Programs of Meetings

Central Electric Railway Association

The fall meeting of the Central Electric Railway Association will be held in Indianapolis, Ind., on Nov. 21 and 22. The program has not yet been arranged.

New England Street Railway Club

The October meeting of the New England Street Railway Club, which was planned for Oct. 10 at the Relay House, Nahant, Mass., has been indefinitely postponed.

National Association of Railway Commissioners

The thirtieth annual convention of the National Association of Railway & Utilities Commissioners is to be held in Washington beginning Nov. 12. In the call for the convention attention is directed to the importance of a study of the condition of the railroads under government control. It is expected that the various state bodies, as well as the national association, will observe this matter closely and be prepared to make recommendation as to advisable courses after the war.

Financial and Corporate

82 Per Cent Decline

Nearly Four Hundred Lines Report Loss of $12,700,000 in Net for First Half of 1918

During the first half of 1918 the electric railway industry showed a most serious falling off in earning power. According to reports received by the American Electric Railway War Board from 388 railways throughout the country, the net income in this period decreased $12,773,036 or 82.16 per cent as compared to the result for the first half of 1917. The companies included operate approximately 30,500 miles of line, or about 63 per cent of the total mileage in the United States. The distribution of the companies is shown in the accompanying table.

The detailed comparative income statement of the reporting companies is presented herewith. In this connection it will be recalled that the ELECTRIC RAILWAY JOURNAL of Sept. 28, page 590, contained a similar tabulation for 293 companies. The loss in net income for these during the first half of 1918 was $8,926,929 or 74.4 per cent.

These loss figures are indeed startling, but even they do not reflect the increases in operating expenses that are resulting and will continue to result from the wage awards of the National War Labor Board. It is now estimated conservatively that the operating expenses of the industry will be increased $100,000,000 annually by the wage awards. The outlook is hardly rosy.

COMPARATIVE INCOME STATEMENT OF 388 ELECTRIC RAILWAYS FOR SIX MONTHS ENDED JUNE 30, 1917 AND 1918

	1918	1917	Increase	
			Amount	Per cent
Operating revenues	$243,372,700	$236,014,436	+ $7,358,264	+ 3.12
Operating expenses	171,792,760	154,496,687	+ 17,296,073	+ 11.20
Net operating revenue	$71,579,940	$81,517,749	—$9,937,809	—12.19
Net revenue from auxiliary operations	7,490,047	7,248,316	+ 241,731	+ 3.33
Taxes	18,189,852	16,745,577	+ 1,444,275	+ 8.62
Non-operating income	3,767,470	3,336,074	+ 431,396	+ 12.93
Gross income	$64,647,605	$75,356,562	—$10,708,957	—14.21
Reductions from gross income	61,874,248	59,810,169	+ 2,064,079	+ 3.45
Net income	$2,773,357	$15,546,393	—$12,773,036	—82.16

DISTRIBUTION OF REPORTING COMPANIES BY STATES

	No. of Companies	Mileage		No. of Companies	Mileage		No. of Companies	Mileage
Alabama	1	60	Maryland	4	525	Oregon	2	55
Arizona	3	47	Massachusetts	16	2,681	Pennsylvania	44	2,621
Arkansas	1	39	Michigan	6	404	Rhode Island	1	400
California	18	2,791	Minnesota	4	578	S. Carolina	1	37
Colorado	3	269	Mississippi	4	59	South Dakota	1	15
Connecticut	4	1,072	Missouri	9	947	Tennessee	6	357
Delaware	1	136	Montana	2	34	Texas	14	593
Florida	4	157	Nebraska	5	250	Utah	2	215
Georgia	6	387	Nevada	1	7	Vermont	1	10
Illinois	50	3,157	N. Hampshire	6	117	Virginia	5	361
Indiana	16	1,840	New Jersey	12	1,204	Washington	15	837
Iowa	10	239	New Mexico	1	3	W. Virginia	4	116
Kansas	5	228	New York	37	3,117	Wisconsin	8	555
Kentucky	5	366	N. Carolina	4	78	Wyoming	1	5
Louisiana	3	255	Ohio	32	2,719			
Maine	7	433	Oklahoma	3	158	Total	388	30,534

Financial News Notes

Receivership Lifted.—The receivership of the Cleveland & Chagrin Falls Railway, Cleveland, Ohio, has been lifted and Robert D. Beatty, who formerly acted as receiver and general manager, continues with the company as general manager.

Plan Reorganization of Ohio Road.—Bondholders have arranged to reorganize the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, which has been in the hands of a receiver for some time. The new company will probably be known as the Cincinnati, Milford & Blanchester Traction Company. The capital stock will be placed at $400,000 and bonds will be issued to take care of the remainder of the cost of the property, purchased recently by the bondholders.

Binghamton Joins Receiverships.—It is reported that Federal Judge Ray has appointed William G. Phelps, president First National Bank, Binghamton, N. Y., receiver for the Binghamton Railway. The application was made on behalf of the Westinghouse Electric & Manufacturing Company. The Binghamton Common Council refused to suspend the company's franchise, which provides for a 5-cent fare. The Binghamton Railway operates 49.74 miles of line and does a general light and power business in Endicott.

Call for Redemption for Sinking Fund.—The Equitable Trust Company, New York, as one of the trustees under the mortgage of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., dated Sept. 1, 1911, is inviting proposals for the sale to it under the provisions of the mortgage of as many bonds secured thereby as will exhaust the sum of $47,025, at a price not to exceed 105 per cent and accrued interest.

Would Sell Three-Mile Line.—The First National Bank, New Bremen, Ohio, of which Julius Bosell is president, is desirous of selling the Minster & Loramie Railway, Fort Loramie, Ohio, a 3-mile road. The railway was sold in May of last year for $23,000 at receiver's sale to C. P. Gress, representing the bank, which acted for creditors of the company. The road was at one time operated by the Western Ohio Railway and was supplied with energy by that company.

Second Avenue Interest to Be Paid.—Pursuant to an order of the Supreme Court of New York, dated Sept. 26, the receiver of the Second Avenue Railroad, New York City, will pay the interest on $3,140,000 of outstanding receiver's certificates at the rate of 6 per cent per annum for the six months period ended Oct. 1, 1918. Such interest will be payable at the Guaranty Trust Company. In this same order the receiver is authorized to issue new certificates to such holders of the old certificates as desire to receive the new ones in exchange. New certificates will be dated Oct. 1, 1918, and will be due Oct. 1, 1919, but will be redeemable at the option of the receiver on April 1, 1919, at par and accrued interest.

Tiffin Abandonment Postponed.—The Tiffin, Fostoria & Eastern Railway proposes to resume service in Tiffin, Ohio, after the passage of the ordinance by the City Council in which the city agrees to the terms by which the fare is raised from a 5-cent straight fare to a 10-cent cash fare, or six tickets for 40 cents, for a trial period of ninety days. Unable previously to come to terms on the fare matter the company had announced its purpose to remove all the rails in the city. The company proposed at first to maintain a cash fare of 10 cents and sell six tickets for 45 cents. The Council would not agree to this, but had an ordinance drawn up providing for a cash fare of 8 cents and six tickets for 40 cents. The compromise of a 10-cent cash fare with six tickets for 40 cents was then arranged.

Abandonment Hearing Oct. 17.—The Railroad Commission of the State of California has set a hearing for Oct. 17 on the application of the Los Angeles & San Diego Beach Railway, Los Angeles, Cal., for permission to discontinue service, dismantle the property, take advantage of the present high price of material to dispose of all the holdings of the company and effect a retirement from the field. The decision of the company to this end was brought about by high wages, the advance in the cost of supplies and materials, competition of the privately-owned automobile and the present existing tendency of people generally to abstain from travel. The hearing on the application will be held in San Diego. Opposition is expected from the citizens of La Jolla.

Receiver for Massachusetts Road.—Eliot S. Emerson, Cambridge, has been appointed receiver of the Plymouth & Sandwich Street Railway, Plymouth, Mass., by Judge Carroll of the Supreme Court on the motion of H. P. Converse Company, Boston, a firm of contractors, which is a creditor of the railway to the amount of $88,771. The company has a suit pending before the full bench of the Supreme Court to compel the town of Plymouth to buy $50,000 of the capital stock of the company, and if on Nov. 1 next it shall have completed a 4-mile extension of its tracks along the borders of the Cape Cod Canal in Bourne, it will receive $35,000 from the canal company. This extension relieved the canal company from building a bridge or tunnel or operating a ferry to provide for travel across the canal, and will furnish direct connection with New York and other points.

Receiver for Connecticut Line.—Harrison B. Freeman, Hartford, Conn., was appointed temporary receiver of the Hartford & Springfield Street Railway, Warehouse Point, Conn., by Judge William S. Case of the Superior Court at Hartford on Sept. 30. The appointment was on the application of W. C. Mason & Company, Inc., a creditor in the sum of $2,500. Mr. Freeman was the unanimous choice for receiver of those representing bondholders and creditors. Judge Case fixed the receiver's bond at $50,000, and under the order of appointment Mr. Freeman has authority to operate the road for a period of four months. The hearing on the confirmation of Mr. Freeman as receiver, and for the appointment of appraisers, will come before Judge Case on Oct. 14. The affairs of the railway were reviewed briefly in this paper for Sept. 28, page 591.

New York Central Control Denied.—Denying reports that the control of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., would soon be taken over by the New York Central interests, W. W. Foster, secretary-treasurer and general manager of the company's interurban properties, has issued a public statement in which he says: "The Buffalo, Lockport & Rochester is the only electric interurban line operating out of Rochester that is independent of the New York Central. Numerous attempts to obtain control of the Rochester & Syracuse line were made by the New York Central, but it was only recently, when the interurban line became involved financially, that control is reported to have passed to New York Central interests. Canadian capital is interested to a considerable extent in the Buffalo, Lockport & Rochester Railway and Canadian capitalists constitute a majority of the board of directors. There is no truth to the report."

Bay State Bonds and Notes.—According to information furnished by the receiver of the Bay State Street Railway, Boston, Mass., $240,000 of mortgage bonds of the Newport & Fall River Street Railway, due on Aug. 1, 1918, have been purchased for the account of the receiver, and $120,000 of 5 per cent plain bonds of the East Middlesex Street Railway, due on Sept. 1, 1918, have been paid and cancelled. The $131,000 of equipment notes due on Aug. 1 were purchased by the receiver, and the interest on equipment notes due in August was paid. No receiver's certificates are outstanding. The $150,000 of first mortgage bonds of the Providence & Taunton Street Railway, which matured on Sept. 1, 1918, have not been paid, and the $57,000 of serial notes of the Bay State Street Railway were not retired on Aug. 15. Judge Martin in the United States District Court on Oct. 4 issued an order for Receiver Donham to pay certain coupons representing interest on the bonds of the Brockton Street Railway and bonds of the Newport Illuminating Company and also to pay dividends at the rate of 6 per cent on the stock of the Chelsea & Boston Railroad.

Receiver for Cumberland Railway.—It was announced at Carlisle, Pa., on Sept. 20 that an agreement had been reached between attorneys for the Cumberland Railway of that place and the attorneys for security holders petitioning for a receiver for the company. The taking of evidence in the proceeding before the court had been almost completed when the announcement was made. Conditions were presented to the court that had been framed by the attorneys for both sides. It has been agreed with other things that the Cumberland Railway be declared insolvent; that C. H. Bishop, president of the Valley Railways; Walter Stuart, vice-president of the Farmers' Trust Company, Carlisle, and J. Harvey Line, an attorney of Carlisle, be appointed receivers; that the present officials of the company be restrained from interfering with the operation of the road by the receivers; that the receivers be permitted to continue the operation of the road and that all creditors, except the Farmers' Trust Company, trustee under the mortgage, be restrained from interfering with the operation of the road. The Cumberland Railway defaulted in the payment of interest due in July.

Electric Railway Monthly Earnings

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., July, '18	$21,577	*$12,163	$9,414	$4,023	$5,391
1m., July, '17	19,992	*10,426	9,566	3,548	6,018
12m., July, '18	247,094	*127,966	119,128	44,782	74,346
12m., July, '17	224,722	*109,727	114,995	42,354	72,641
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., July, '18	$11,966	*$10,738	$1,228	$1,439	†$211
1m., July, '17	15,560	*11,067	4,493	1,239	3,254
12m., July, '18	114,955	*121,726	†6,771	16,069	†22,840
12m., July, '17	125,866	*120,294	5,572	13,926	†8,354
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.					
1m., July, '18	$44,532	*$34,835	$9,697	$6,535	$3,162
1m., July, '17	40,500	*25,293	15,207	6,552	8,655
12m., July, '18	490,079	*348,958	141,121	78,399	62,722
12m., July, '17	433,185	*259,179	174,006	78,734	95,272
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., July, '18	$97,806	*$45,226	$52,580	$32,806	$19,774
1m., July, '17	87,491	*35,953	51,538	31,075	20,463
12m., July, '18	1,188,710	*474,938	713,772	385,372	328,400
12m., July, '17	1,005,468	*381,253	624,215	344,726	279,489
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., July, '18	$105,878	*$56,484	$49,394	$12,847	$36,547
1m., July, '17	84,332	*45,682	38,650	11,760	‡28,622
12m., July, '18	1,039,675	*573,041	466,634	151,787	‡334,218
12m., July, '17	907,336	*491,431	415,905	121,803	‡300,799
EL PASO (TEX.) ELECTRIC COMPANY					
1m., July, '18	$99,957	*$70,955	$29,002	$7,048	$21,954
1m., July, '17	103,171	*66,712	36,459	4,940	31,519
12m., July, '18	1,268,850	*836,912	431,938	79,253	352,685
12m., July, '17	1,243,515	*767,016	476,499	60,494	416,005

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.					
1m., July, '18	$29,509	*$18,730	$10,779	$5,006	$5,773
1m., July, '17	31,927	*17,127	14,800	5,098	9,702
12m., July, '18	335,059	*220,931	114,128	60,499	53,629
12m., July, '17	340,201	*200,597	139,604	62,095	77,509
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., July, '18	$71,731	*$57,864	$13,867	$16,540	†$2,673
1m., July, '17	54,322	*36,387	17,935	15,730	2,205
12m., July, '18	798,960	*562,000	236,960	193,855	43,105
12m., July, '17	659,770	*442,501	217,269	187,078	30,191
NORTHERN TEXAS ELECTRIC COMPANY, FORT. WORTH, TEX.					
1m., July, '18	$251,534	*$158,630	$92,904	$28,172	‡$74,315
1m., July, '17	190,881	*116,601	74,280	29,148	45,131
12m., July, '18	3,139,472	*1,789,296	1,350,176	342,654	‡1,103,355
12m., July, '17	2,123,306	*1,245,755	877,551	349,706	527,845
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., July, '18	$26,548	*$21,088	$5,460	$8,263	†$2,803
1m., July, '17	25,180	*19,240	5,940	7,545	†1,605
12m., July, '18	307,239	*229,984	77,255	95,435	†18,180
12m., July, '17	308,693	*226,846	81,847	87,504	†5,657
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., July, '18	$44,388	*$31,720	$12,668	$8,252	$4,416
1m., July, '17	32,947	*18,274	14,673	7,805	6,867
12m., July, '18	428,959	*273,035	155,924	95,795	60,129
12m., July, '17	309,397	*178,785	130,612	93,102	37,510
TAMPA (FLA.) ELECTRIC COMPANY					
1m., July, '18	$86,826	*$52,486	$34,340	$5,087	$29,253
1m., July, '17	78,623	*45,136	33,487	4,369	29,118
12m., July, '18	1,011,844	*590,439	421,405	61,416	359,989
12m., July, '17	1,001,735	*546,826	454,909	52,228	40,268

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

W. F. C. Impatient

Rebukes New Orleans Mayor for Not Carrying Out Promises Upon Which It Advanced $1,000,000

A telegram was received by Martin Behrman, Mayor of New Orleans, La., from the War Finance Corporation on Sept. 30, requesting the city authorities to take immediate action looking toward an increase of fares and new rates for gas and electricity by the New Orleans Railway & Light Company.

COUNCIL MET ON OCT. 1

In view of the above telegram a meeting was called on Oct. 1 by the Commission Council at the request of the Mayor and an ordinance was introduced by Mr. Glenny, member of the Commission Council, allowing the company to increase fares to 6 cents and its rates for gas and electricity by 30 per cent.

Under the law the ordinance must lie over for a week before being taken up for final passage. The measure provides that the bondholders shall receive their interest, but that stockholders shall not receive any dividends until the loan of $1,000,000 made to the company some time ago by the War Finance Corporation is paid. The ordinance specifically states that all of the increased net revenue derived shall be set aside and dedicated to the payment of this loan, and that the increased rates shall be permitted to remain in effect only until such time as this loan shall have been liquidated.

The matter dates back several months when the Mayor and other city officials urgently and repeatedly requested the War Finance Corporation to make a large advance to the company, representing that such advance was necessary to prevent interruption of war activities and to avert receivership. Many leading citizens joined in this request.

APPEAL REFUSED AT FIRST

The War Finance Corporation decided absolutely to refuse to lend the amount first requested or any amount unless the city agreed immediately to put into effect increases in fares and light rates that would produce adequate net earnings. Following this the Mayor furnished the War Finance Corporation with a copy of minutes of the meeting of the Commission Council at which the Mayor was authorized to carry into effect an agreement between the city and the company under which adequate net revenue would be assured to the company. Furthermore the Mayor telegraphed the War Finance Corporation on June 24 that the city had agreed to readjust rates immediately so as to enable the company to earn 6 per cent net on a valuation of $43,000,000. Upon receipt of this telegram, and in the firm belief that the city intended to put the necessary increased rates into effect immediately, the War Finance Corporation agreed to advance and did advance the company $1,000,000.

After reciting these facts the War Finance Corporation, through W. P. G. Harding, managing director, in its letter of Sept. 30 said:

"Two months have elapsed since the loan was made but no increases in rates have been put into effect and the company has been operating at a heavy deficit. We cannot understand why you have failed to put these increased rates into effect and must insist upon your doing so without further delay.

"If you do not immediately put such rates into effect the company will be unable to continue to pay the increased wages awarded by the National War Labor Board and by your action you will jeopardize the security for the War Finance Corporation's loan made at your request. Your failure to make good your representation will be an exhibition of bad faith on the part of the city of New Orleans that will seriously injure your credit and standing.

"The honor of New Orleans is therefore involved and unless sufficiently increased fares and lighting rates are established by the city to insure reasonable wages to employees, adequate service, protection of your local financial situation, and the War Finance Corporation's loan the public will inevitably conclude that the city of New Orleans has repudiated a moral obligation incurred by its Mayor and other duly authorized officials.

EXPERT EXAMINATION MADE BY CORPORATION

"Our expert, Mr. Proutt, is in New Orleans making a thorough examination of the property, accounts and management of the New Orleans Railway & Light Company and is thoroughly qualified to estimate the extent of such absolutely necessary advances as will accomplish the desired object. He will place at your disposal all information so obtained.

"You should have no difficulty in making it plain to your citizens that the New Orleans Railway & Light Company cannot render services at war costs for the same rates and fares that prevailed prior to the war and that the moderate increases proposed are essential to the maintenance of railway and lighting services, the protection of the local financial situation, to the continuance of proper service to your war industries and to the compliance with the promises and obligations of the city of New Orelans upon the faith of which the War Finance Corporation extended aid."

Six Cents in Baltimore

New Rate Has Gone Into Effect There With Minimum of Discomfort Through Use of Tickets

The United Railways & Electric Company, Baltimore, Md., put the 6-cent fare rate into effect on Oct. 1. The schedule calls for a fare of 6 cents for adults; 4 cents for children between four and twelve years of age, and an increase in the charge for commutation tickets of 1 cent for each fare zone.

PUBLICITY'S PERSUASIVE POWER

A great deal of publicity had been given to the fare increase and patrons had been urged in the press, by car cards and otherwise to help start the new plan smoothly by presenting the exact change or car tickets when they boarded cars. T. A. Cross, president of the company, voiced his appreciation of the public's hearty co-operation in the following statement given to the newspapers:

"I certainly appreciate the manner in which the Baltimore public co-operated with our conductors to-day. Our reports indicate that most patrons had the exact fare or a ticket ready, and there were practically no delays.

"With this splendid spirit of help we can hasten the solution of many of our service problems. My observations and reports made to me speak well for the courtesy of our conductors, and I wish to thank them.

"The use of tickets is apparently a popular move. We have had many requests to increase the number of places where tickets may be bought, and we are now securing the co-operation of merchants to this end."

It might be mentioned that the demand for tickets was so great that the supplies furnished to the places that originally sold tickets were exhausted several times the first day.

To that original list of sales places have been added others until now tickets may be bought in any section of the city and in counties near by.

TICKET SALES HELP IMMENSELY

The sales places include newspaper offices, banks, cigar stores, drug stores, department stores, factories, etc.

At all of these points the tickets are handled without fee or commission, and solely through the desire of the proprietors to accommodate the public.

The tickets are also on sale, of course, at all the carhouses of the railway, at the Howard and Franklin Street waiting room, and at the cashier's office in the Continental Building.

The change in fare is in accordance with the tariff filed by the company with the commission on Aug. 28. The new schedule, of course, is subject to any action the commission may take on the petition for relief filed previously. A hearing on this application will be held by the commission in November. The necessity for raising the fares prior to action by the commission arose from the fact that before such a decision could be had an increase in wages went into effect on Sept. 1.

Park Advertised in Fall

The London (Ont.) Street Railway has made effective use of advertising in the promotion of traffic to Springbank Park during the past summer and has succeeded in prolonging the season substantially. Usually the park is dead by the second week of September, when the annual exhibition of the Western Fair Association is held. Assuming that advertisements published in the newspapers during the summer had been read by many in the rural districts and near-by towns, and that thus a large amount of missionary work had been done, the company made a big bid for business with fair visitors. One advertising stunt was the utilization of the placards illustrated.

SASHES USED FOR ADVERTISING

Printed in bold type on newsprint, they were posted on the inside of the upper sashes of the cars. The cost was small, but the effect was striking and their appearance neat. Every line in the city carried the message and, though the weather was most unfavorable, good results were secured. The photograph shows one of the cars in daytime. With the lights on inside they were quite as easily read at night. The first window, used for the route sign, was not covered.

Portland Interurban Rate Hearing

The Public Service Commission of Oregon recently undertook a hearing in Portland, with the view of determining if the application of the Portland Railway, Light & Power Company for an increase in its interurban passenger fares should be granted. Business men of Oregon City testified that a fair increase in rates would be favorably considered by the business people of that city. An increase of 10 cents over the present one-way fare of 20 cents was suggested. R. A. Leiter, attorney for the company, said that the company was entitled to a 6 per cent return on its investment. Such a return would approximate $299,128. The return during the year ended June 30, 1917, was only $71,503. It would be still smaller for this year.

Franklin T. Griffith, president of the company, at the hearing, recommended that the cent as the unit of currency receive official recognition. The present interurban fares are based on the nickel as unit. They were set in November, 1911, by the commission. Frank Miller, chairman of the commission, approved the suggestion, indicating that the commission may use the cent basis in settling the new fares.

The hearing was continued to Sept. 24 to allow city representatives time to introduce evidence showing why the increases should not be allowed.

The hearing is also under way on the company's petition for an increase of 25 per cent in freight rates on its interurban lines, and on the Willamette Valley & Southern Railway, operated by the Portland Railway, Light & Power Company. The proposed freight rate increase would parallel that of federal railroads, but basic rates are lower.

Atlanta Fare Appeal Denied

Judge George L. Bell, of the Fulton Superior Court has handed down a decision denying the petition of the Georgia Railway & Power Company, Atlanta, Ga., for a writ of mandamus against the State Railroad Commission, to compel that body to assume jurisdiction in the matter of street car fare increases. The company desires to secure authority to charge a 6-cent fare with 2 cents extra for each transfer.

Several weeks ago the Railroad Commission handed down a decision granting electric light, power and gas rate increases to the company, but refused to consider the petition for an increase in car fares. The commission held that under the law it had no authority to alter the schedule of car fares in the city of Atlanta for the reason that those fares were fixed by a contract between the municipality and the power company which had been consummated some years before the organization of the commission on its present basis.

The company then filed with Judge Bell a petition for a writ of mandamus to compel the Railroad Commission to assume jurisdiction in the fare matter.

Luther Z. Rosser, Sr., one of the chief counsel for the company, stated that the case would be appealed to the Supreme Court of the State for a final construction of the law governing the situation. This appeal must be taken within twenty days.

Judge Bell handed down no formal opinion in explanation of his action, but merely issued the order denying the appeal.

Wants Government to Act

Mayor George J. Karb of Columbus, Ohio, has forwarded a communication to President Wilson, advising that the government assume control of the operation of the railway lines of the Columbus Railway, Power & Light Company in the city. This step came as a surprise to the local officials and members of the City Council who have been endeavoring to handle the matter and prevent an increase in the rate of fare. Among other things Mayor Karb says:

MAYOR SEES NEED

"At the present time, and since the company made this change (change in fare) thousands of people are riding the cars without paying fares. The company claims that the final step taken was made necessary by the action of the War Labor Board in increasing the wages of its men. It has also pointed out the increased cost of all materials used by it in the service. Last winter, due to transportation troubles, the coal supply obtainable by the company was so limited that service had to be greatly reduced. The company had trouble, too, with its power plants with like results. The result is that much feeling was created against the company.

"Our city charter provides for referendum. If the Council should enact legislation to relieve the company, a referendum would undoubtedly be demanded and a campaign would but add to the opportunity for trouble.

"As I have said, it seems to me that a situation has been reached when settlement of this question is not within the power of local officials and that preservation of peace, the question of justice as between non-paying and paying passengers, the maintenance of service and conservation of the property of the company, require the matter to be taken under control by the government during the existence of the war."

CITY ATTORNEY OBJECTS

City Attorney Henry L. Scarlett characterized the step as ill-advised. He contends that the company desires the government to take control of the road, since the rate of fare would then probably be increased. The trouble, he said, is that government representatives do not always understand the situation and a rate they would make might be unjust to the public.

Mayor Karb has advised all along that Columbus follow the lead of other cities and establish a temporary rate of fare to take care of increased expenses, but the City Council opposed this, apparently with the idea that the company could be forced, no matter what the ultimate result, to continue at eight tickets for a quarter.

The recent step of the City Council in considering a resolution calling for an investigation of the company's financial affairs is mentioned by Mayor Karb, but he feels that any result from this would cause too great delay. As the Mayor sees it, the situation needs immediate attention.

Transportation News Notes

Galesburg Wants One-Man Cars.—The Galesburg Railway, Lighting & Power Company, Galesburg, Ill., has petitioned the Public Utilities Commission of Illinois for permission to operate one-man cars on certain lines in that city.

Amended Schenectady Petition.—The Schenectady (N. Y.) Railway has filed with the Public Service Commission for the Second District a proposed schedule of increased rates, which it seeks permission to put into effect on Nov. 1. The hearing on the original application of the company, set for Oct. 8, has been postponed until Oct. 23.

Skip Stops in Effect in Dallas.—The locations for skip stops have been made for all street car lines of the Dallas (Tex.) Railway, and the skip-stop system of operation was to be put into effect on Oct. 1. The system had been put into effect on several Dallas lines long before the request from the federal government, and the plan met with instant approval.

Six Cents in Mattoon.—The Central Illinois Utilities Compay, Mattoon, Ill., has been granted a 6-cent fare in the cities of Taylorville, Mattoon and Charleston. The company is also allowed by the Public Utilities Commission of Illinois to withdraw from sale the twenty-five tickets which have been selling for $1 and to place on sale twenty-two tickets for $1.

Again Threatens Suspension.—The New York & North Shore Traction Company, Roslyn, N. Y., again threatens to suspend all service. Officials of the company say that unless the promise of a 7-cent fare is made very shortly by the city of New York all service will be stopped immediately. The plea of the company for an increase in fare has been before the city for some time. The period of grace set originally by the company expired on Sept. 30.

Penalty for Dare-Devil Riders.—The City Council of Camden, N. J., has adopted an ordinance placing in the disorderly class all persons found riding on the top of electric railway cars or in any part except the space designed for passengers. A fine of $10 will be imposed in each case. The ordinance aims to prevent shipworkers and other industrial employees from climbing to the roof of cars and hanging on the bumpers and fenders.

War Increase for Springfield, Ill.—The Springfield (Ill.) Consolidated Railway has been authorized by the Public Utilities Commission of Illinois to increase local fares from 5 cents to 6 cents. The company is required to sell nine tickets for 50 cents, this increased ticket rate comparing with six tickets for 25 cents and twenty-five tickets for $1. The increase is to remain effective until six months after the close of the war.

Holyoke Wants Five-Cent Central Zone.—The Holyoke (Mass.) Street Railway on Oct. 2 filed with the Public Service Commission of Massachusetts a petition for the right to substitute for the present zone-fare system one based on mileage, calling for 2 cents a mile by the use of tickets and 2½ cents a mile cash fare, with a minimum charge of 5 cents. The zone system has been in operation less than six months. The proposed change would take effect on Nov. 1.

Chicago & West Towns Wants Seven-Cent Fare.—The Chicago & West Towns Railway, Chicago, Ill., on Sept. 28, asked an increase in interurban fare from 5 cents to 7 cents before Walter A. Shaw, Public Utilities Commissioner. Charles N. Hebner, auditor of the company, testified that during the last eight months the increase in wages was $66,000, the increased cost of materials $40,000, and the loss, through decrease in the number of passengers, $45,000. He testified that even the 7-cent rate asked will not allow the company to pay dividends.

Traffic Suspended Following Explosion.—The Mayor and the Public Service Commission of the city of New York fearing the effects on submarine and bridge structures of the munition plant explosions in New Jersey on Oct. 5, shut off the traffic over and under the rivers. They had no opportunity to inform the public in advance of the curtailment of transportation facilities, and consequently considerable confusion resulted. Nearly 100 persons are reported to have been killed in the explosion and millions of dollars of damage was done to property in suburban New Jersey and in lower New York.

Trenton to Continue Tickets.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., will after Oct. 14 sell strip tickets at the rate of five for 30 cents instead of the six for 25 cents. The plan to sell tickets was decided upon because the public was accustomed to tickets. This will also relieve the conductors of making change for the extra cent. The tickets will be sold only at the office of the company. The company will have its large cars equipped with fare boxes. The tickets now in use will not be honored after Oct. 14, when the new 6-cent rate becomes effective under the order of the Board of Public Utility Commissioners.

Fare Increase Probable in Pittsburgh.—In commenting on the settlement of the matter of wages for the employees of the Pittsburgh (Pa.) Railways, the Pittsburgh *Dispatch* said in its issue of Oct. 3: "While no announcement has been made by the receivers of what effect the increase granted the men will have upon fares, all three receivers of the railway have said it will mean an increase in fares, to make which an application will shortly be made to the State Public Service Commission. The increase most talked of is a straight 7-cent fare for Pittsburgh, replacing the 5 and 7-cent fare which is now in effect."

Miscellaneous Freight Increases Asked.—The Western New York & Pennsylvania Traction Company, Olean, N. Y., has applied to the Interstate Commerce Commission for increases varying from 5 cents to 15 cents in rates on merchandise package freight carried on passenger cars; an increase of half a cent a gallon on milk; an increase from $1 to $1.15 a month on newspapers tied in bundles, maximum weight 360 lb. a month, weight in excess to be charged 35 cents a 100 lb. and an increase of 5 cents each on baby carriages, go-carts, bicycles and tricycles.

Another Increase Needed Now.—A hearing will be held on Oct. 22 on the application of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., for a 7-cent zone fare between Trenton and Princeton. The Board of Public Utility Commissioners of New Jersey has ordered the company to suspend the increase until Dec. 10 unless prior to this date the board should approve of the new rate. The company, which recently received an increase from 5 to 6 cents, announced that 7 cents would be charged in each zone on and after Sept. 26. The company is also asking for a 7-cent fare on its divisions in the State of Pennsylvania.

Smoking Stopped on Boston Elevated.—Special smoking cars and smoking compartments on the rapid transit system of the Boston Elevated Railway have been discontinued. While the public trustees have ordered the elimination of special facilities for smokers "temporarily," in response to an emergency request by the health authorities, it is unofficially reported that they may never be restored. This action of the trustees follows the recent recommendation of the Massachusetts Public Service Commission that the smokers be abolished entirely on the trains operating upon the elevated railway lines of the company and through the Cambridge subway.

Receiver Wants Seven-Cent Fare.—On Sept. 24, C. I. Cole, receiver of the Atlantic City & Shore Railroad, Atlantic City, N. J., again asked the Board of Public Utility Commissioners of New Jersey to grant an increase in fare. The present request is for a 7-cent fare. Last July the company asked for an increase from 5 to 6 cents to go into effect in August, but the board suspended the application. The company now asserts that its income is not sufficient to keep the road in operation, and that it is carrying fewer passengers because of the close of the summer season. The board has requested additional information regarding the need for more revenue.

Pennsylvania Line Wants Seven-Cent Zones.—The Public Utility Commission of Pennsylvania will hold a hearing on Nov. 12 on the application of the Northampton, Easton & Washington Traction Company, Easton, Pa., for another increase in fares. The company is asking for a 7-cent fare for each of the seven zones between Phillipsburg and Port Murray. The company claims that the expenses have increased and that there has been a falling off in traffic, 377,000 fewer fares being collected last year than in 1910, 1911 or 1912. A few months ago the commission granted the company permission to advance the zone fare from 5 cents to 6 cents.

Zone Fares for Government Line.—The Virginia Railway & Power Company, Richmond, Va., has issued a statement in regard to its plan to operate the Richmond-Seven Pines Railway for the government. The statement says: "Under the arrangement made with the United States Housing Corporation, the fares for transportation on this property will be under the zone system; one zone to be from Twenty-ninth and P Streets to Stop 23, and one zone to be from Stop 23 to Seven Pines. A single cash fare of 5 cents will be charged from any point in one zone to any point in the same zone, and an additional cash fare of 5 cents from a point in one zone to any point in the other zone."

Councilmen Undergo Change of Heart.—At the regular meeting of the City Council of Columbus, Ohio, during the week ended Oct. 5 Councilman Giffin submitted a resolution, requesting the Columbus Railway, Power & Light Company to furnish full information of its income and operating expense for the last two and one-half years. It is supposed this information is desired for the purpose of investigating the claims of the company for a higher rate of fare. The resolution, it is said, will have the support of Councilmen Westlake, Zimpfer and Alcott, all of whom have in the past opposed any change from the present rate of fare. The appeal of the Mayor to President Wilson in this matter is referred to on page 674 of this issue.

New Jersey Officials on Fare Study.—Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., with H. C. Donecker, assistant general manager, M. R. Boylan, general auditor, and Dr. Thomas Conway, Jr., have returned from Pittsburgh, St. Louis, Milwaukee, Cleveland and other cities where they studied fare systems and methods of fare collection. Data were secured on the zone system in accordance with the recommendation for a study of this method made by the Board of Public Utility Commissioners of New Jersey. Mr. McCarter is chairman of the company's special committee on fares. The company has completed the work of taking a census of car riders on all the lines. Clerks are now classifying the data so obtained.

Exempt from Prosecution.—The Kentucky Court of Appeals on Oct. 1 rendered a decision to the effect that the South Covington & Cincinnati Street Railway, Covington, Ky., cannot be tried and convicted for maintaining a nuisance under an indictment found against it in the Kento Circuit Court, where it was accused of having failed to furnish a sufficient number of cars on the Rosedale line. In the absence of statutes and ordinances on the subject, the court held that a street railway, operating wholly within the State, is exempt from prosecution on this allegation. The claim was made that cars were overcrowded and the service was detrimental to the health and comfort of the passengers.

Michigan State Fare Case Begun.—Trial of the injunction case brought by the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., against the State of Michigan to prevent the enforcement of the state 2-cent fare law was opened recently before United States Judge Sessions. Attorney Chamberlain, for the railroad, said that when the steam roads were taken over by the government, passenger rates were increased to 3 cents a mile. Interurban roads asked for increases. They were refused on the ground that the State law governed fares. As noted in the ELECTRIC RAILWAY JOURNAL for July 27, page 173, the company filed suit to "test the validity and enjoin the enforcement of the statute of the State of Michigan fixing the maximum fare for railroads at 2 cents a mile."

Boston Fare Grades Established.—In order to meet the requirements of the statute providing for the public operation of the Boston (Mass.) Elevated Railway, which calls upon the trustees within sixty days after the establishment of the original rate of fare under the act to adopt and publish a schedule of eight grades of fare containing four rates above and four rates below the existing rate, the trustees have established the following schedule of grades of fare, but wish the public clearly to understand that the action involves merely a literal compliance with the provisions of the statute and does not change the present 7-cent fare: first grade below, 6 cents; second grade below, 5 cents; third grade below, 4 cents; fourth grade below, 3 cents; first grade above, 8 cents; second grade above, 9 cents; third grade above, 10 cents; fourth grade above, 11 cents.

Elevated and Surface Line Papers.—Each of the affiliated subway elevated and surface lines in New York City has a little paper of its own now. Some time ago *The Subway Sun* was established for posting in the windows of the cars of the Interborough Rapid Transit Company. Now that company has followed with *The Elevated Express* for posting in the elevated cars, while the New York Railways is using the *Green Car Traveler* as a means of carrying messages to its patrons. All these publications are issued over the signature of Theodore P. Shonts, president of the companies. The two new papers are fashioned after *The Subway Sun*, a description of the contents and the purpose of which have been the subject of comment in the ELECTRIC RAILWAY JOURNAL previously.

Johnstown Wants More.—The Johnstown (Pa.) Traction Company is preparing a new tariff to be filed with the Public Service Commission, which will place fares on the 5-cent zone system and will become operative about Oct. 15. Main street will be a dividing line and two 5-cent fares will be charged from Morrellville and Coopersdale to Franklin or Moxham. Ferndale is included in the single zone to Main Street, but the 5-cent rate will not apply on Windber cars. There will be three zones, as usual, between Johnstown and Windber, but they will be increased to 10-cent zones, instead of 5, making the fare to Windber 30 cents and to Ferndale 10 cents on a Windber car. By using the city cars and the transfer privilege to the special Ferndale car, the fare to Ferndale will be only 5 cents. Evan M. du Pont, the president and general manager, explained that this step was necessary because of the increased cost of operating and the failure of the 6-cent fare to produce sufficient revenue. Those who are now paying 6 cents fare and are not exceeding one of the newly-created zones will save 1 cent on each fare hereafter.

A Disadvantage Turned to Account.—Justice Louis W. Marcus in the Supreme Court of Erie County, granted the petition of the International Railway, Buffalo, N. Y., discontinuing the injunction proceedings brought by agreement with the city to determine if the Public Service Commission for the Second District has the authority to consider the complaint by which the Council sought to have fares reduced from 5 cents to 4 cents. The company is now willing to have the municipal authorities proceed with its 4-cent fare case filed with the commission two years ago. The municipal authorities have always maintained that the International Railway could give good and efficient service with a 4-cent fare and therefore proceedings were started by the Mayor to bring the matter before the State utilities board. The railway questioned the board's jurisdiction in municipal rate cases where franchises are involved and an injunction was secured by the company which prevented the city from proceeding with its case. The present attitude of the company is that by discontinuing the injunction the city will be forced to go on with its case and then the company will have an opportunity to present its evidence as to the needs of a 6-cent fare before the commission. The municipal authorities will now undoubtedly withdraw the complaint. Henry W. Killeen, of counsel for the International Railway, is preparing to oppose any such move on the part of the representatives of the city.

Legal Notes

KANSAS—*Where Defect in Floor Could Have Been Seen, Injury Caused by It Not Prima Facie Evidence of Company's Neglect.*

The doctrine of *res ipsa loquitur* is properly applied in case of injuries to a passenger caused by the collision with another train, the breaking of a rail, or by some defect in the equipment of the train about which the passenger is presumed to know nothing, because he has no way of anticipating it. It has no application to a case where a passenger is injured by some defect in the floor of the car which is visible to the passenger and which causes the passenger to fall while attempting to alight from the train at a station. Hence, where a passenger of an interurban railway was injured because of a defect in the floor of the vestibule of the car in which her foot caught while she was alighting, it is error to charge that the injury is *prima facie* evidence of negligence on the part of the carrier. (Cloud *vs.* Kansas-Oklahoma Traction Company, 173 Pacific Rep., 338.)

MICHIGAN—*Parol Evidence of Meaning of "Reasonable Dispatch."*

Where bill of lading provides for transportation of goods "with reasonable dispatch," parol evidence of a conversation wherein carrier assured shipper before signing of bill of lading that goods would reach destination before certain time is admissible as bearing on carrier's understanding of what was a reasonable time, and is not objectionable as varying terms of bill of lading. (Harmon *vs.* Michigan United Traction Company, 168 Northwestern Rep., 522.)

MICHIGAN—*Injury from Temporary Road During Track Construction—Implied Invitee.*

Where an interurban railway in building a culvert temporarily leased a right-of-way over neighboring land to enable travelers to pass around the obstruction in the highway, a traveler injured by being thrown from his wagon on account of a hole in such temporary road was an implied invitee. (Brown *vs.* Michigan Railway, et al., 168 Northwestern Rep., 419.)

MISSOURI—*Newsboy Injured While Being Ejected.*

A newsboy who went on a car to sell papers was struck and injured by a conductor while being ejected and the company claimed that the conductor was acting without the scope of his authority, and evidence showed that there had previously been ill-will between the two. The court held that the railway was liable for injuries even in the case of such ill-will if it grew out of a former conflict which arose in the line of the conductor's duties. (204 Southwestern Rep., 826.)

MISSOURI—*Report of Accident by Conductor Excluded as Evidence.*

In a street car passenger's action for personal injuries due to a premature starting of the car, the conductor's report of the accident to the company was properly excluded, being a report of his own conduct to his superior. (Rogers *vs.* Kansas City Railways, 204 Southwestern Rep., 595.)

NEW YORK—*Injuries on Track of High Speed Railway.*

An interurban railway was not liable for death of a boy, who went upon the track in front of a car approaching at 30 to 50 miles an hour, in a light snow, at a point where the motorman had no reason to anticipate the act. (Benham *vs.* Schenectady Railway, 171 New York Sup., 260.)

NEW YORK—*Injury to Passenger While Conductor Turned Switch.*

It was not negligence as a matter of law for a street railway company to have its conductor leave the car to turn a switch at the end of the route, as respects a passenger boarding the car while the conductor was so engaged. (Clarke *vs.* New York Railways, 171 New York Sup., 248.)

NEW YORK—*Public Service Commission Has No Power to Order 20 Per Cent Amortization Fund.*

Under the public service commissions law, which provides that the commission may establish a system of accounts to be used by railroad corporations or other common carriers and prescribe the manner in which such accounts shall be kept, the commission had no authority to require the preservation of 20 per cent of the gross recipts to establish an amortization fund for the renewal of a street railway when the existing equipment should be no longer capable of use. (People *ex rel.* New York Railways, et al., *vs.* Public Service Commission of First District, et al., 119 Northeastern Rep., 848.)

NEW YORK.—*Employee Riding When Off Duty Is a Passenger.*

A guard employed by a transit company by the hour or trip, whose duties ceased on the arrival of his train at a certain station at 2.10 p.m., and who was not required to resume work until 4.58 p.m., but who remained on the train in uniform and in the passenger car to return on some personal business, though it did not appear that he had paid his fare, was a passenger, entitled to maintain an action for injury from a collision and to rest his case upon proof of the collision. In such a case, the guard was not entitled to any relief under the workmen's compensation act (Consol. Laws, chap. 67), which requires an applicant for relief to be in the service of the employer when injured, which requirement was not changed by the amendment by Laws 1916, chap. 622. (Pierson *vs.* Interborough Rapid Transit Company, 168 New York Sup., 426.)

New Publications

Directory of Engineers

Issued by the American Association of Engineers, Chicago, Ill., 6 in. x 9 in., cloth, 192 pages, price $2.

Contains a brief synopsis of the experience and training of all members of the association.

American Wood Preservers Association Proceedings

Published by the association, F. J. Angier, secretary, Mount Royal Station, Baltimore, Md.; 262 pages. Price in cloth, $3.50; in paper, $2.50.

The volume covers the proceedings of the 1918 meeting and includes a number of papers of interest to electric railway maintenance-of-way engineers.

Saving Coal in Boiler Plants

By Henry Kreisinger. Technical Paper 205, U. S. Bureau of Mines. One copy from bureau, free; extra copies from Superintendent of Documents, Government Printing Office, Washington, D. C., 5 cents each.

A practical treatment of the subject intended for the fireman, engineer or owner of small or medium-sized, hand-fired plant.

The Diesel Engine; Its Fuels and Its Uses

By Herbert Haas. Published by the United States Bureau of Mines as Bulletin 156—Petroleum Technology No. 44. 133 pages. One copy free from Bureau of Mines; extra copies 25 cents each from Superintendent of Documents, Government Printing Office, both Washington, D. C.

This is a very extended study of the Diesel engine from a practical standpoint. Details of construction of several commercial engines are given and a comparison is made of the advantages and disadvantages of Diesel engine plants as compared with steam turbine plants. Some data regarding costs are given also.

Handbook of Mechanical and Electrical Cost Data

By H. A. Gillette and Richard T. Dana, McGraw-Hill Book Company, New York; 1716 pages with index. Price $6.

This book is designed to be a companion volume to the "Handbook of Cost Data" by Gillette and the "Handbook of Construction Plant and Its Cost" by Dana. These three handbooks are written so as to overlap. In case the question should be raised, of what value are cost data when the prices of labor and material change so rapidly the authors have an answer ready. They show first that no printed prices are really "up to date," but if unit costs are given, old cost data can be serviceable if the present-day labor and material prices are substituted. The volume under review contains many figures from appraisals, operating records, etc., of steam plants, electrical distribution system and railways, with a discussion of general economic principles.

Personal Mention

Builds Road in Spain

After Completion of Improvements at Barcelona, Mr. Harrsen Returns to America—Formerly in Mexico

H. P. Harrsen, managing director since March, 1915, of the Ebro Power & Irrigation Company, the Sarria & Barcelona Railways and the Cataluna Railways, all of Barcelona, Spain, and all controlled by the Barcelona Traction, Light & Power Company, having resigned, has just returned to this country and will spend the coming winter at his home in Florida.

H. P. HARRSEN

Mr. Harrsen was born in St. Louis, Mo., in 1875. After graduating from the public schools of that city he entered the employ of the Emerson Electric Manufacturing Company of St. Louis. His next position took him to Mexico as assistant superintendent of the Aguascalientes Electric Light Company at Aguascalientes, Mexico. Two years afterward, the tramway system in Mexico City, later incorporated under the name of the Mexico Tramways Company, Ltd., was acquired by an English syndicate and the company's first American general manager, Thomas H. McLean, appointed Mr. Harrsen his secretary.

Mr. Harrsen remained in Mexico until his chief, Mr. McLean, left to accept the position of vice-president and general manager of the Toledo Traction Company. Mr. Harrsen accompanied Mr. McLean to Toledo where he spent seven years with the Toledo traction system in different capacities, from clerk to superintendent. He next received the appointment of general superintendent of the Mexico Tramways Company, in which the late Dr. F. S. Pearson, head of various international companies, had become financially interested and was then president. During the following eight years he became successively general superintendent, general manager and finally managing director of the Mexican Light & Power Company, president of the Pachuca Light & Power Company, and managing director of the Mexico Tramways Company.

In March, 1915, Dr. Pearson appointed Mr. Harrsen managing director of his Spanish company in Barcelona.

T. D. Moberg has been appointed chief accountant of the Rock Island (Ill.) Southern Railway to succeed George Homrig.

A. C. Colby has been appointed master mechanic of the Connecticut Company at Bridgeport and Norwalk, to succeed William F. McCoy.

L. F. Eberbach has been appointed secretary of the Fort Wayne & Decatur Traction Company, Decatur, Ind., to succeed Dick M. Vesey.

William Plaag has been appointed master mechanic of the Peoria Railway & Terminal Company, Peoria, Ill., to succeed William Hassman.

George F. Fisher has been appointed superintendent of the light and power department of the Cumberland County Power & Light Company, Portland, Maine, to succeed W. C. Billings.

V. H. Cos has been appointed chief engineer of power station of the Fort Wayne & Northern Indiana Traction Company with headquarters at La Fayette, Ind., to succeed J. Ross Sharp.

William L. Weldin has been appointed safety inspector and chief of guards for both the railway and lighting departments of the Wilmington & Philadelphia Traction Company, Wilmington, Del.

George Sprague, Jr., has been appointed assistant secretary and assistant treasurer of the Commonwealth Power, Railway & Light Company, with headquarters in New York, to succeed G. H. Bourne.

Fred H. Libby, superintendent of the commercial department of the Bangor Railway & Electric Company, Bangor, Maine, has also been appointed purchasing agent of the company to succeed Preston Mann.

L. E. Holderman has been appointed engineer of maintenance of way of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., to succeed W. F. Carr.

William Bellmar has been appointed western division superintendent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, with headquarters at Michigan City, Ind., to succeed W. C. Kambs.

I. L. Oppenheimer has retired from the presidency and active management of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, but will retain his financial interest in the company and will likely remain a member of the board of directors. In 1899 Mr. Oppenheimer, together with the late U. S. Grant, both then of Pomeroy, conceived the idea of building an electric railway to connect the towns of Middleport, Pomeroy, Minersville, Syracuse and Racine. Actual work on construction of the road was started in May, 1900, and on Nov. 15 of the same year the first car was operated from Middleport to Racine. Later the road was extended from Middleport to Hobson Station on the Kanawha & Michigan Railway which gives the road its present 12.07 miles of track, independent of switches. Mr. Oppenheimer has been a director and officer of the company since its organization, and in 1902 took over the active control of the road and retained the position up to the present time. In 1912 he was elected president of both the railway company and the Pomeroy & Middleport Electric Company, a subsidiary of the railroad furnishing current for lighting and power purposes. From 1908 to 1912 he was located in Lexington, Ky., with the railway and lighting properties, but at the same time continued the management of both Pomeroy companies. He was also for a short time connected with the Norfolk & Portsmouth Traction Company, the Fort Wayne & Wabash Valley Traction Company and the Newport News & Old Point Railway & Electric Company. Ever since he became interested in the Pomeroy corporation, Mr. Oppenheimer has been active in the work of the Ohio Electric Light Association and was this year elected president of the association. He has made no definite plans for the future other than to take an extended rest and vacation.

I. L. OPPENHEIMER

Otto Gottschalk, who formerly was assistant superintendent of electrical equipment with the Interborough Rapid Transit Company, New York, N. Y., has been made master mechanic of the Richmond Light & Railroad Company, Staten Island, N. Y.

Oliver D. Davis, chief clerk of the freight department of the Detroit (Mich.) United Railway, has resigned to join the sales force of the Ohio Rubber Company's Detroit office. For fourteen years Mr. Davis has been connected with the freight department of the Detroit United Railway.

J. D. Dugan has been appointed superintendent of railway of the Vicksburg Light & Traction Company, Vicksburg, Miss., to succeed C. E. Warwick, who, as recently noted in the ELECTRIC RAILWAY JOURNAL, has become connected with the Eastern Wisconsin Electric Company at Sheboygan as railway superintendent.

Earl Lones, formerly general shop foreman People's Railway, Dayton, Ohio, has been appointed acting master mechanic to succeed Joseph H. Towle, who, as announced in the Sept. 21 issue of this paper, resigned to accept a position of assistant electrical engineer with the Railway Improvement Company, New York.

Harry Hartwell, formerly of the Pearson Corporation, but now connected with Chandler & Company, New York and Philadelphia, bankers, is in temporary charge of the property of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, succeeding I. L. Oppenheimer, who has retired as president and manger of the company, as noted elsewhere in this department.

C. Nesbitt Duffy, vice-president of the Manila Electric Railroad & Light Company, Manila, P. I., is chairman of the Liberty Loan campaign committee in Manila. The *Cable News American*, in commenting on this appointment, says, "Mr. Duffy is considered to be the best choice that could have been made for this place. His ability as an organizer and his energy and enthusiasm are without limit."

George S. McClure, assistant engineer of the engineering department of the Pacific Electric Railway, Los Angeles, Cal., has received a commission as first lieutenant, Seventieth Engineers, and is at Camp Humphries, Accotink, Va. Mr. McClure entered the employ of the Pacific Electric Railway on July 1, 1903, as chainman and was promoted to levelman two years later. In 1912 he became assistant engineer, which position he occupied until he entered the service of the nation.

Theodore P. Shonts, president of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, at the invitation of the New York *Evening Post*, told in the magazine supplement of that paper for Sept. 21 about the effort being made by his companies to provide something like adequate service in these trying times. He emphasized the point that from a purely selfish outlook it was to the advantage of the railways to supply the riding public with adequate service at all times.

H. A. Crane, treasurer of the Northern Massachusetts Street Railway, the Connecticut Valley Street Railway and the Concord, Maynard & Hudson Street Railway, has also been appointed secretary of the various companies, with headquarters at Greenfield, Mass., to succeed R. M. Stoughton. Mr. Crane has been treasurer of the companies since the beginning of 1916, previous to which time he was connected with the banking firm of Bodell & Company, Springfield, Mass., and Providence, R. I. He was at one time assistant treasurer of the Massachusetts Agricultural College.

A. L. Linn, treasurer of the United Gas & Electric Corporation and the United Gas & Electric Engineering Corporation, New York, N. Y., has also been appointed assistant secretary of the latter company to succeed J. F. Muller, Jr., and secretary and treasurer of the American Cities Company and assistant treasurer of the Elmira Water, Light & Railroad Company, to succeed H. J. Pritchard. Before his connection with the United Gas & Electric Corporation and the United Gas & Electric Engineering Corporation, Mr. Linn was assistant to Horace E. Andrews, president of the New York State Railways and the Mohawk Valley Company, controlling the electric railways and the electric lighting and gas companies in Rochester, Syracuse and other cities in the central part of New York State.

John E. Cullen has been appointed an additional assistant to the president of the United Railways & Electric Company, Baltimore, Md. This appointment is in line with the policy of the company to enlarge its staff so as to hasten the solution of the many problems which have been created by the war. Mr. Cullen, who assumed his duties on Oct. 1, will pay particular attention to the question of public regulations and publicity. He is a Baltimorean, well known as a special writer and former city editor of the *Evening Sun*. He is a student of municipal problems, including transportation, and has an intimate knowledge of Baltimore. He has been engaged in newspaper work in New York City for the last three years, returning to Baltimore to accept this new work.

George Theis, Jr., president of the Arkansas Valley Interurban Railway, Wichita, Kan., and during the past seven months in active control of the properties of that company, has retired from active management in favor of Charles H. Smyth, general manager, who recently returned from the service of the American Red Cross Society in France. Mr. Theis has found it necessary to give up active management because of attention claimed by the many other affairs in which he is interested. In addition to being president of the Arkansas Valley Interurban Railway, he is president of the Midland Light & Ice Company, Dodge City, Kan., of the Southwest Cracker Company, Wichita, Kan., and of the Theis Ranch Company, Englewood, Kan., and also a director in several banks. Besides all this he holds extensive interests in other commercial enterprises and railroads. He will continue with the Arkansas Valley Interurban Railway as president in an advisory capacity, with headquarters in the city of Wichita.

Obituary

Major Evans Dead

There are but few men in the electric railway field whose death will be felt as much as that of Major Evans, who passed away at his home, 50 Montgomery Place, Brooklyn, on Sept. 8, following an attack of pneumonia. Major Evans had been associated with the Lorain Steel Company for thirty-four years and during that time had taken an active part in electric railway matters where his sound common sense and geniality made themselves felt for the good of the cause. No man had more friends than Major Evans and his death will be sincerely mourned.

HENRY CLAY EVANS

Henry Clay Evans was born in Pittsburgh, Pa., on May 4, 1850. He was for many years connected with the Pennsylvania State Militia as a member of the Duquesne Grays and served on the staff of Maj. Gen. A. L. Pearson, with the rank of major. He took an active part in the organization of the American Electric Railway Manufacturers' Association and has been a member of its executive committee since 1906, having been re-elected in 1909, 1912 and 1915. He served as vice-president of entertainment during the year 1913. Major Evans was also a member of the Engineers Club of Boston, the Railroad Club of New York, the Crescent Athletic Club and the Lyres Club. He leaves a widow; a daughter, Mrs. Amidee T. Haviland, and two sons, Clay, an ensign in the United States Navy, and Whiting.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Buying Rails Under War Conditions

Purchasing Agent Must Recognize War Demands and Find Out Just What Material Can Be Utilized

From the observations of an experienced maintenance of way engineer the following side lights upon the purchase of rails for an electric railway serving an Eastern city and its suburbs appear of interest. In times past the company specified with no lack of bidders, the kind of rails it desired, the various deliveries promised were compared, prices noted, and the award made with the full expectation that the necessary rails would arrive not far from the expected date. Now the problem is to get any rails whatever and having gotten them, to lay them perhaps not by directly employed company labor but by contractors' forces. Sometimes even this installation can only be accomplished after the real or fancied objections of local municipal authorities to the type of construction forced by the war are overcome.

RAILWAYS MUST EXPLAIN NEEDS

The demand of our overseas forces for rails must first be met, and the railway purchasing agent who overlooks this patriotic necessity and goes to Washington with an appeal in his bag and a chip on his shoulder because the steel companies decline to accept his order as desired for fulfillment in specific detail is certain to experience an awakening. The question now is, can a particular company be supplied with rails of any section whatever capable of carrying its traffic? It is necessary for the company in every case to lay its cards face upward on the table and explain its exact needs to the manufacturers and to the government authorities controlling the production and shipment of rails.

If the desired cross-section and quantity cannot be obtained, and the chances are that this will be the case generally except on the basis of exceedingly long deliveries, it will do no good to pound the table in a red-faced fashion and demand the material, even on the strength of being a buyer for an essential industry. The purchasing agent and his engineering colleague having charge of the road and maintenance conditions must take what they can get and be duly appreciative, and it is only a waste of energy and time to inveigh against the manufacturers and the government authorities for their inability to meet conditions beyond their control.

The wise purchaser of rails finds out what substitute sections and weights are possible on his system at the points where the proposed construction or repair work is to be done. He keeps track of the second-hand market (sometimes an operating company succeeds in picking up a real bargain in rails in this way), and when he sits down with the manufacturers and the government representatives he is ready to put the case before them in the clearest possible way; to show the necessity of the purchase in relation to the carrying forward of the war, and to decide promptly whether or not any "tag ends" of orders can be utilized, or whether by a change in specifications the situation can at least be temporarily met. If the need of ship plates exceeds the demand for rails, the fact must be accepted with the best possible grace. It has been found that by being perfectly frank most will be gained, and the railway buyer can be assured from the experience gotten that everything that can be done to meet genuine maintenance needs on essential lines will be done.

Supply of Sweeper Rattan Short

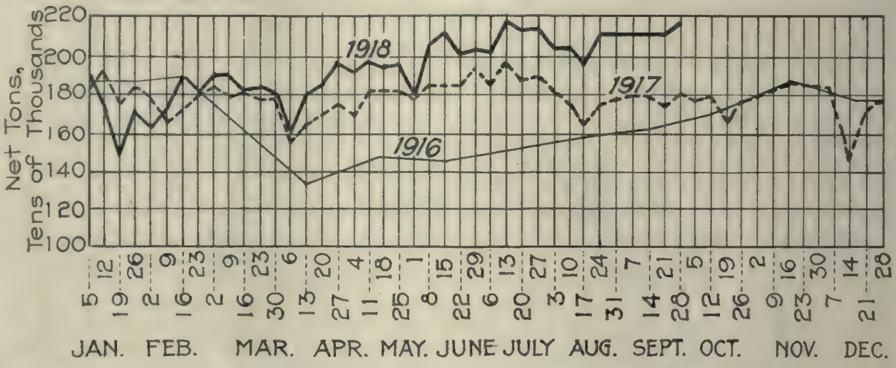
The market of sweeper rattan is still in a most unsettled condition, with wide price fluctuations. Owing to the ruling of the War Trade Board reported in the Aug. 3 issue of the ELECTRIC RAILWAY JOURNAL and which is still in effect, no imports can be had and there is a great shortage of this material in the market. Prices are ranging from 38 cents a pound to 40 cents a pound with an extreme high of 55 cents reported by one dealer.

Demand at the present moment is not great but with next month the demand for supplies for winter operation is expected to begin in volume, naturally resulting in greatly diminished stocks.

Coal Production Again Increasing

Bituminous Output 2.5 Per Cent and Anthracite 12.1 Per Cent Greater Than Previous Week.

Bituminous coal production during the week ended Sept. 28 not only exceeded 13,000,000 net tons but also records the third successive week of increased production, according to the weekly report of the Geological Survey. The output during the current week (including lignite, and coal made into coke) is estimated at 13,043,000 net tons, an increase over the week preceding of 325,000 net tons or 2.5 per cent, and over the corresponding period of 1917 of 1,863,000 net tons or 16.7 per cent. The average production per working day, during the week of Sept. 28, is estimated at 2,174,000 net tons, 9 per cent in excess of the average daily production for the coal year to date and 6.7 per cent in excess of the average daily requirements during the balance of the coal year to make up the deficit.



ESTIMATED AVERAGE TOTAL PRODUCTION PER WORKING DAY OF BITUMINOUS COAL, INCLUDING COAL COKE

During the past six summer months, or the first half of the coal year, production of bituminous coal is estimated at 311,216,000 net tons. This output, which is 33,418,000 net tons or 12 per cent in excess of the production during the same period of 1917, but falls short of requirements during the current year to date by 10,897,000 net tons or 3.4 per cent, the increase in requirements this period over the output for the same period last year amounting to 44,315,000 net tons or approximately 16 per cent.

The production of anthracite in the United States during the week ended Sept. 28 is estimated at 2,071,000 net tons, an increase over the week preceding of 224,000 net tons or 12.1 per cent, and over the corresponding week of last year of 65,000 net tons or 3.2 per cent. The average daily production during the current week is estimated at 345,000 net tons as against 338,000 net tons during the coal year to date and as compared with 330,000 net tons during the same period of 1917. Total production from April 1 to Sept. 28 is estimated at 51,651,000 net tons, an increase over 1917 of 1,072,000 net tons or 2.1 per cent.

Slack Adjusters in Considerable Demand

Carloads Lots Shipped—Activity Due to Shortage of Labor and Conservation Measures

Considerable interest is being reported in automatic brake slack adjusters, according to the manufacturers, due primarily it is believed, to labor shortage in electric railway shops. From all parts of the United States and Canada calls are reported to have come for information regarding the cost and requests for trial sets, as well as orders.

In some instances, railways which have installed adjusters have made an extended study of the savings effected, and it is reported that the Philadelphia Rapid Transit Company has even considered a reduction in air compressor service, due to the elimination of slackness in the brake rigging, and consequent saving in piston travel and compressor operation. In a number of other instances the reduction in brake shoe consumption has led to the purchase of adjusters, but the leading factor seems to be labor shortage.

Government Priorities Still Control

There is some difficulty at the present time in securing materials, but it is said that practically all orders so far have been covered by government priorities, which has enabled the manufacturers to make up adjusters in quantities. One manufacturer even states that adjusters are being shipped in carload lots. In fact, installations have generally been made in considerable quantities, one railway company being reported to have purchased 5250 adjusters.

One uncommon phase of this market is the interest being shown by the electric railway transportation and claim departments. It is rather unusual for manufacturers to correspond with these departments on the subject of their equipment, but in this case one manufacturer reports considerable correspondence with claim departments on the subject of reduction in accidents caused by slack or bad-order brakes, and with transportation departments in reference to the point that the installation of the apparatus makes all cars handle alike in braking.

Prices remain about the same but are subject to change due to the variation in prices of steel shafting and malleable castings. Deliveries can be made in from two weeks to two months, depending upon whether standard types of adjusters are ordered and provided priority orders are received.

Kansas City One-Man Cars

The Kansas City Railways, as reported in our issue of Aug. 31, has purchased fifteen closed one-man safety passenger cars. The specifications follow:

Number of cars ordered	15
Name of road	The Kansas City Railways.
Date order was placed	July 17, 1918.
Builder of car body	American Car Company
Type of car	Closed one-man Safety Passenger
Seating capacity	30
Length over all	27 ft. 9½ in.
Truck wheelbase	Width over all, 8 ft.
Roof	Arch
Air brakes	Westinghouse and Safety Equipment
Axles	Hammered steel—cold rolled if available
Car signal system	Faraday
Control	K-10 double end
Couplers	Standard
Curtain fixtures	Curtain Supply Company, Rexall metal rollers
Curtain material	Pantasote-pattern K-2, Col. 86
Designation signs	1—Hunter Illuminated, latest type
Door operating mechanism	Air and hand
Fare boxes	International, C-17
Fenders or wheelguards	American Car Company standard
Hand brakes	Brake staff steel with necessary ratchet wheel, dog and floor plate at bottom, 112 inch standard drop handle.
Heater equipment	Eight Peter Smith truss plank
Headlights	Golden Glow SM-95
Motors, type and number	Six cars, 506 A. M. 2; seven cars, G. E.-258 two-motor equipment with K-10 double-end control.
Sanders	Two sand boxes under seats each end of car
Sash fixtures	Single sash, drop in pockets
Seats	Seven American Car Company reversible cross seats, hinged
Seating material	Steel, cherry wood and rattan
Step treads	Feralun safety treads, 3 in. wide
Trolley catchers or retrievers	Keystone
Trolley base	U-S-15-B
Trucks	Brill Spec. 78-M-1, Brill friction bearings
Ventilators	Eight small size, Utility Ventilating Company ventilators in roof
Wheels	Cast chilled charcoal iron, 24 in. diam. 2½ in. wide, flange ⅝ in. deep 1 in. thick

Winnipeg Car Specifications

Specifications on the ten new motor cars recently ordered by the Winnipeg (Canada) Electric Railway, as reported in the ELECTRIC RAILWAY JOURNAL on July 13, are furnished by the builders. the Ottawa Car Manufacturing Company:

Name of road	Winnipeg Electric Railway
Number of cars ordered	10
Seating Capacity	46
Type of car	Double-truck, single-end, semi-steel motor cars
Roof	Arch
Weight of car body	1900 lb.
Length of car body	33 ft. 3 in.
Length of front vestibule	5 ft.
Length of rear vestibule	7ft. 6 in.
Length over bumpers	45 ft. 8 in.
Width over all	8 ft. 6 in.
Distance between bolsters	21 ft. 6 in.

Keystone illuminated side window signs are being installed on each rear window and front vestibule side window. The interior lighting arrangements include five shaded lights in the center of the arch roof, through a selection switch on the rear platform over the conductor's position. The cars have two-leaf vestibule doors, folding out and back, controlled by the motorman and the conductor. Folding steps are operated in conjunction with the folding doors. Hale & Kilburn light-weight seats are used, and the heating arrangements provide for Peter Smith No. 2-P-O hot-air heaters. Trucks, ai brakes and motor equipment are supplied and installed by the railway company.

Raw Materials Control Production

War Requirements Are Now Sufficient to Almost Absorb All Steel and Copper Output

Raw materials for some time have been the governing factor in the production of electrical goods and railway material. To-day this condition exists in a still more aggravated form and is daily becoming worse. Production great as it is, is limited and by no means large enough to supply fully all of the demand being made upon it at the present time.

It is daily becoming more evident that everything not absolutely essential to the winning of the war must be greatly curtailed in production. In fact, it would not be surprising if industries that have received priority classification of B or lower obtained only just as much steel, copper, brass or lead as is necessary to take care of actual war orders. That an industry receives a classification in the preference list by no means insures that industry that it will obtain the raw materials required.

The war requirements for steel, it is well known, are greater than the mills can supply. The same is true of copper. Production of copper has suffered considerably of late, largely through labor trouble. Lead supply also is low.

Consumers of copper must have permits the same as for iron and steel Only this week the War Industries Board put the brass industry under control with respect to distribution of raw material.

Lumber Market Conditions to Be Studied

Every phase of the lumber industry relating to production costs, market and price conditions, is to be made familiar to lumbermen throughout the country by the National Lumber Manufacturers' Association. R. B. Goodman acting president of the association in 1917, is chairman of the Bureau of Lumber Economics which has been organized. This bureau proposes to find out, among other things, the amount invested in the industry, how much timber there is in the country and the amount owned and controlled by the industry, the value of the country's timber, and of timber controlled by the industry, cost of production, available supply of lumber as represented by stocks and production, and the supply collectively, the source, kind and volume of demand, and the price being obtained individually as well as by the industry as a whole.

Recent Incorporations

Anniston & Camp McClellan Transportation Company, Anniston, Ala.—Incorporated to construct a line from Anniston to Camp McClellan. Capital stock, $160,000. L. L. Crump, Anniston, secretary. [July 27, '18.]

Franchises

Gloucester City, N. J.—The Emergency Fleet Corporation has received a franchise from the Common Council for the construction, operation and maintenance of a double-track electric line throughout various portions of the city, to provide additional transportation facilities for workers engaged in the various shipbuilding and other war plants in this section.

Mansfield, Ohio—The Richland Public Service Company has received a twenty-five year franchise from the City Council of Mansfield. The franchise provides for a straight 5-cent fare until Jan. 1, 1920, when, if fare regulation be deemed necessary, such action can be taken by mutual agreement or arbitration.

Waco, Tex.—The Texas Electric Railway has received permission from the City Council of Waco to remove its tracks on Speight Street from Fifth to Eighth Streets and to place the line formerly on South Fourth Street from Speight to Oakwood Cemtery on South Fifth Street.

Salt Lake City, Utah.—The Bamberger Electric Railway has received permission from the Public Utilities Commission of Utah to construct an extension to connect its main line with the spur track of the Oregon Short Line in North Salt Lake.

Track and Roadway

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—A new double-track street railway, 3 miles long, will be built by the War Department through Camp Hancock. The Augusta-Aiken Railway & Electric Corporation will furnish the rolling stock and power and will operate the line.

Columbus (Ga.) Railroad.—Plans are being contemplated by the Columbus Railroad for the construction of an extension into the military camp near Columbus.

Lincoln (Ill.) Municipal Street Railway.—Work will soon be begun on the reconstruction of the tracks of the Lincoln Municipal Street Railway on Eighth and Union Streets. The old rails on the loop formerly connecting the Illinois Central station line with the Woodlawn line are being removed and will be used to build an extension to the Latham Mining Company to accommodate the miners.

Paducah Traction & Light Company, Paducah, Ky.—Improvements are being contemplated by the Paducah Traction & Light Company to its track amounting to about $25,000.

Bangor Railway & Electric Company, Bangor, Maine.—A 113-ft. steel bridge will be built by the Bangor Railway & Electric Company at Six Mile Falls, at a cost of about $12,000.

Kansas City (Mo.) Railways.—Contracts have been awarded by the Kansas City Railways for the extension of the second track on the Country Club line from Sixty-first Street Terrace to the south side of Sixty-third Street. Work has also been begun on the reconstruction of the Prospect Avenue line from Thirty-ninth Street to Swope Parkway. It is the intention of the company to construct a loop at that point. Plans of the company include the construction of loops at other terminal points as soon as possible.

Springfield (Mo.) Traction Company.—This company reports that it has just completed the reconstruction of its track on Nichols Street.

Cooke County Transit Company, Lewiston, Mont.—It is reported that plans are being made by the Cooke County Transit Company for the construction of its proposed line from a point near Gardiner along the Yellowstone River to the Lamar River to Soda Butte Creek. Richard Zahniser, Livingston, secretary. [May 11, '18.]

Missoula (Mont.) Street Railway.—A new steel and concrete bridge will be built at once by the Missoula Street Railway over Rattlesnake Creek on East Pine Street. The contract for concrete work has been awarded to the Forseen & Settergreen Company, Missoula. Owing to the shortage of steel, the trestle work will be temporarily of wood.

Norfolk, Va.—The government has authorized the construction of a concrete viaduct over the trolley tracks across Maryland Avenue at the army base. The viaduct will be 1700 ft. long and 17 ft. high, and will include space for double street car tracks, two 8-ft. sidewalks and a 32-ft. roadway. The cost will be about $300,000. A. O. Leach, supervising engineer of construction at army supply base.

Virginia Railway & Power Company, Norfolk, Va.—A concrete and steel drawbridge will be erected by the Virginia Railway & Power Company across Tanner's Creek.

Power Houses, Shops and Buildings

United Railways & Electric Company, Baltimore, Md.—A contract has been awarded by the United Railways & Electric Company to Singer-Pentz Company, Baltimore, for the construction of a service station at Columbia Avenue and the Baltimore & Ohio Railroad tracks.

Menominee & Marinette Light & Traction Company, Menonimee, Mich.—A report from the Menominee & Marinette Light & Traction Company states that it is completing the installation of a 1650-kw. hydro-electric unit at its Rapids power plant.

Great Falls (Mont.) Street Railway.—The Montana Power Company, which operates the Great Falls Street Railway, has awarded a contract to Fitzgerald & Staunton, for construction of an extension to the new wire mill of the B. & M. Smelter, and it is expected this line will be in operation by Nov. 1. All the wire for the overhead work, as well as the ground wires, will be made in the new wire mill to which the extension will be built.

Public Service Railway, Newark, N. J.—Plans have been prepared by the Public Service Railway for the construction of a new administration building to be located at its terminal at Broadway and Morgan Street, Camden, near the plant of the New York Shipbuilding Corporation.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Plans have been prepared by the Trenton & Mercer County Traction Corporation for the installation of a quantity of new generating equipment in its power plant to provide for increased operations. The company was recently ordered by the Board of Public Utility Commissioners of New Jersey to improve its service, and new rolling stock has been ordered and other improvements will be made in compliance with the ruling of the board.

Richmond Light & Railroad Company, New York, N. Y.—Arrangements, it is reported, have been completed by the Richmond Light & Railroad Company for extensive improvements and extensions to its plant and system. The United States government, it is understood, will finance a loan to the company of about $600,000, to provide funds for the work.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Canton Sheet Steel Company has promised a loan of $45,000 to the Northern Ohio Traction & Light Company to finance the construction of an extension to its factory.

Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa.—A report from this company states that it will construct a small carhouse for the storage of an electric locomotive, to cost about $3,000.

Nashville Railway & Light Company, Nashville, Tenn.—The City Commission of Nashville has entered into a contract with the Nashville Railway & Light Company for electricity to operate the municipal electric light and power system during the period of the war. The city has closed down its electric generating plant at the request of the United States government.

Texas Electric Railway, Dallas, Tex.—The Texas Electric Railway has purchased a site between Kentucky and Tennessee Streets, McKinney, and will soon erect an express terminal and build extensive trackage to care for its growing express and freight business. The improvements contemplated will cost about $25,000.

Rolling Stock

Madison (Wis.) Railways has purchased five one-man cars from the American Car & Foundry Company.

Union Traction Company, Nashville, Tenn., is in the market for one double-end control 1200-volt motor car.

Springfield (Mo.) Traction Company, as noted in the ELECTRIC RAILWAY JOURNAL of Sept. 14, expects the arrival of twelve pay-as-you-enter, one-man cars about Oct 10.

Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa., has purchased from the Cincinnati Car Company three semi-convertible single-truck cars.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is calling for quotations on fifteen cars with specifications approximately as follows: Length over all, 45 ft.; length over body, 32 ft.; width over all, 8 ft.; seating capacity, 48; semi-steel; double truck; four 35-hp. motor equipment; 26-in. wheels; weight, about 35,000 lb.; air brake; non-registering fare boxes; wheel guards. It is hoped the contract will be closed at a very early date.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., expects delivery on Dec. 15 from the J. G. Brill Company, of an eight-wheel double-end Wasson nose-type, plow which can be equipped with M. C. B. couplers for locomotive work when the noses are dismounted. The purchase of this equipment is being financed by the United States Shipping Board, Emergency Fleet Corporation, in order to improve electric railway transportation facilities at the Bath, Me., shipyards.

Trade Notes

Shephard Electric Crane & Hoist Company, Montour Falls, N. Y., announces that it has appointed A. J. Barnes as export manager with headquarters at the main office. Mr. Barnes will also continue to be director of publicity.

Association of Chilled Car Wheel Manufacturers—The meeting of this association scheduled for Oct. 8 has been postponed until Oct. 15. The convention will be called at 10 a. m. in the State Apartment of the Waldorf Astoria, New York City. George A. Griffin is secretary.

B. H. Tripp, special representative of the Chicago Pneumatic Tool Company on the Pacific Coast, has succeeded M. W. Priseler as district manager of sales for the Pacific Coast territory. His headquarters are at 627 Howard Street, San Francisco. The Los Angeles branch of the company, at 521 Title Insurance Building, comes under Mr. Tripp's jurisdiction.

Railway Improvement Campany, New York, N. Y., announces the acquisition of J. B. Miller to its engineering staff. For the present Mr. Miller will make his headquarters at Boston, Mass. To accept his new position Mr. Miller resigned from the General Electric Company, where he had been employed in both the railway supply and publication departments.

E. O. Shreve has been promoted from assistant manager to manager of the San Francisco office of the General Electric Company. Graduating from the Iowa State College and receiving his apprentice work at Schenectady Mr. Shreve went West in 1906. He passed successively through the stages of salesman at the San Francisco office, manager of the Reno (Nev.) office, turbine expert at San Francisco, manager of the supply department at San Francisco, and finally to his present post.

New Advertising Literature

Alliance Machine Company, Alliance, Ohio: Catalog describing in considerable detail electric cranes of many varieties for use particularly about steel mills and power plants.

Indianapolis Switch & Frog Company, Springfield, Ohio.: Treatise on electric welding for track and shop repairs and conservation of track and roadway for the prevention and cure of track disease. This bulletin discusses welding by electricity by three methods. Track joining and bonding is also discussed in this booklet, with directions on how to care for the welder. Instructions for applying welded joints and bonding plates are also given.

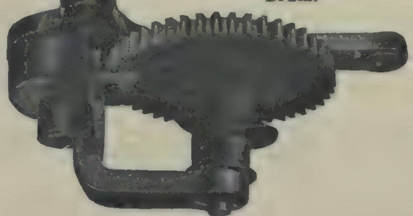
El Paso is a Big User of Peacock Brakes

El Paso's hot, dry climate does not render air brakes subject to the troubles they are afflicted with in Northern climes. Nevertheless, the El Paso Electric Railway is a big user of Peacock Brakes, including all-day trip-by-trip service.

For the plain, straightforward reason that the Peacock Brake BRAKES surely and safely for less first and upkeep cost than any other brake whatsoever.

Peacocks will give YOU better service, on old cars or new, whether in one-man or two-man service.

National Brake Co.
Buffalo, N. Y.


The Eccentric Drum.

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

THE J. G. WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . . . NEW YORK
LONDON CHICAGO

STONE & WEBSTER
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
ELECTRIC RAILWAY MANAGEMENT
SUPERVISION OF CONSTRUCTION
ENGINEERING
APPRAISALS
52 VANDERBILT AVE.
NEW YORK
343 District Bldg.
Washington, D. C.

SANDERSON & PORTER
ENGINEERS
REPORTS • DESIGNS • CONSTRUCTION • MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT AND POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

REPUBLIC ENGINEERS INC.
CONSULTING AND CONSTRUCTING ENGINEERS
Valuations Reports Investigations
Designs Construction Management
60 BROADWAY, NEW YORK
CLEVELAND, OHIO
Illuminating Bldg.
YOUNGSTOWN, OHIO
Mahoning Bank Bldg.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 SOUTH LA SALLE STREET
CHICAGO

You are a faithful subscriber and reader of the Electric Railway Journal. You know how useful it is to you. Why not give us the names of those of your electric railway friends who would also benefit by being subscribers to the Electric Railway Journal? We will be glad to send specimen copies to any names and addresses that you mention.
ELECTRIC RAILWAY JOURNAL

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

WOODMANSEE & DAVIDSON ENGINEERING CO.
ENGINEERS
MILWAUKEE
First National Bank Bldg.
CHICAGO
784 Continental & Commercial National Bank Bldg.

THE SEARCHLIGHT SECTION
will locate the Man you want
Position you want
Equipment you want
Are you using the Searchlight? 58

H. M. Byllesby & Company, Inc.
NEW YORK
Trinity Bldg.
CHICAGO
No. 208 So. La Salle St.
TACOMA
Washington
Purchase, Finance, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties.
Examination and reports. Utility Securities Bought and Sold.

THE P. EDW. WISH SERVICE, Inc.
DETECTIVES
Suite 1710
Park Row Bldg., New York
Suite 715
Board of Trade Bldg., Boston

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

LEND THE WAY THEY FIGHT
SCOFIELD ENGINEERING COMPANY
Philadelphia, Pa.

"—that these dead shall not have died in vain"

Make the Victory Sure

All the effort made till now,—the men, the ships, the munitions, the food,—a noble effort though it is—counts for naught unless more and mightier efforts be added. The Hun must be driven to accept a just and retributory settlement.

Join the Fighting Fourth

Buy Liberty Bonds as the Boys in France fight —to the very utmost

Buy the first day,—September 28; don't postpone buying until the last day,—October 19

Buy quickly — at any bank — cash or instalments

Liberty Loan Committee of New England

Extracts from personal letter of First Lt. R. D. Skinner, U. S. N. A., formerly of the Boston Herald Staff

Headquarters U. S. Air Service,
France, June 16, 1918.

* * * "I can't tell you of all the wonder of these days — of the great stirring fact that we seem to have arrived in time, and of the tribute the French are paying us by giving us the worst posts of the battle because they know we will not fail them — and of the privilege we have now, not merely to step in and seal a victory, but to bring that victory from 3000 miles, like a vast wave, and to drive it far into Germany! It seems as if overnight it has become a wonderful thing just to be an American, and to be one of that vast army of young men, so splendidly young — that is fighting like the wrath of God to make the world the place they want it to be for them and theirs. Don't think me foolish — but idealism has come back into this war again, and America has made it the ideal of youth against distorted old-age, of determination to live against the will to blast all life! If you could only see how young this army is that you meet everywhere in France, that is fighting at every end of the line, and swarming overseas on every ship! It's the most astounding thing in the world's history, and on certain days something happens to our eyes and we are able to see the thing in its true proportions. It is worth a life just to live today."

METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

120 BROADWAY, NEW YORK

How Advertisers Can Help the Country

The business man whose advertising copy reflects only cold, selling, logic may make sales, but he is not making the most of his opportunity.

Today advertising must do double duty,—and it is equal to the task. It must, above all, advance the Allied cause.

Advertising copy that does not help win the war should not have government approval. Nowadays, government approval and popular approval are practically synonymous. Advertising copy that helps win the war is welcomed officially as well as commercially.

This condition is a burden only to the short sighted. To those with business vision it is Opportunity.

The business of war and the war of business are in complete harmony. In both the immediate objective is of no importance except as it affects the ultimate result.

The application of these truths to the advertising program requires only straight thinking, open eyed observation and a desire to help the Nation.

Copy that tells the advertiser's story in relation to the war, tells his character—and character is the basis of business confidence.

Copy that exploits wares without reference to the nation's needs meets approval neither from fighters nor from buyers.

Copy that conserves materials by teaching better use of the advertised product meets official endorsement and builds the firmest foundation for commercial progress.

Copy that smothers needless buying puts the breath of life into future sales.

Copy that diverts capital into Liberty Bonds conserves future buying power.

Copy that promotes confidence raises business above danger from wars, embargoes, shipping difficulties and priorities.

Only those business men who never forget the future will never be forgotten.

How best to apply the kind of copy the world expects of all American business today is a problem on which Electric Railway Journal advertising counsel is competent to advise.

ELECTRIC RAILWAY JOURNAL

A War-time Service Co-operating with Dr. Garfield

WAR-TIME high steam demands have not only definitely established the supremacy of stoker-firing over hand-firing. In addition they have emphasized the necessity for studying individual plant *fuel* and *load* conditions and then choosing a type of stoker to meet those particular conditions.

Fuel demands of essential war industries have dictated changes in fuel distribution which are of wide military advantage to the Nation—many plants formerly operating with high-grade *low*-ash coals now use lower grade *high*-ash coals.

Changed firing methods must necessarily follow.

To the end that the power plant field may adapt itself to this situation without diminishing vital war production, this company offers, gratis, engineerng resources and data accumulated during 21 years' experience in the specialized field of combustion—economical burning of lower grade *high-ash* middle west and western fuels.

PATENTED GECO APPLIANCES

Chain Grate Stokers are particularly adaptable to the economical burning of low grade high-ash coals. We will arrange for prompt delivery of Green Chain Grates to plants handling essential work.

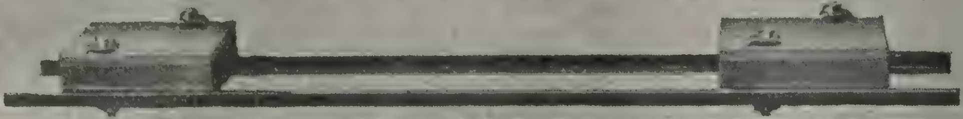
Green Engineering Company

East Chicago, Ind.

GREEN

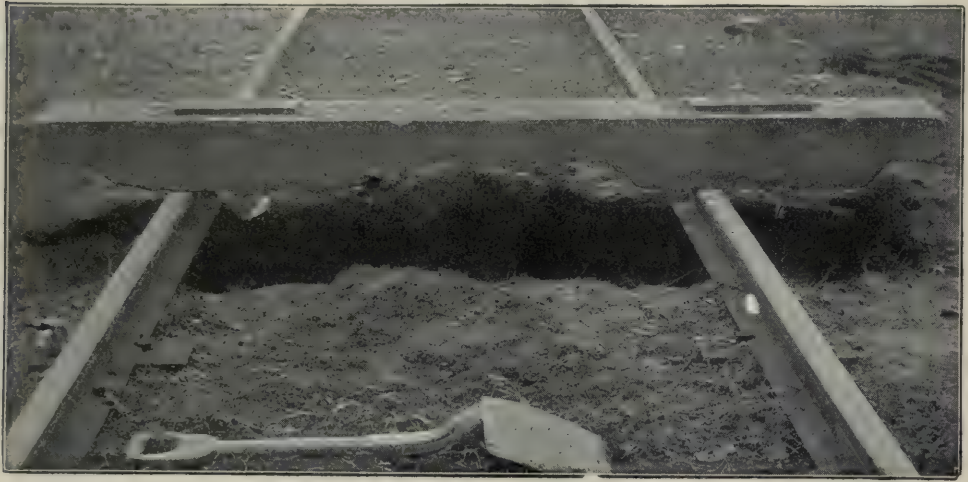
CHAIN GRATES

The MECHANICAL RAILWAY TIE



Here is a Demonstration

The mechanical tie shown in this illustration was modeled in concrete for open track use.



It was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for **Six Years.** Its condition shows plainly—it's as good as when it was installed.

The 6-in. steel I-beam, shown here, has been in use for **Five Years** under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely **one** of a number similarly dented and hammered.

Just Study the Pictures

Then write us for further details.

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO

What does it Cost You per Mile per Year to Maintain Track?

The chances are that if your maintenance methods do not include the consistent and regular use of a

RECIPROCATING TRACK GRINDER

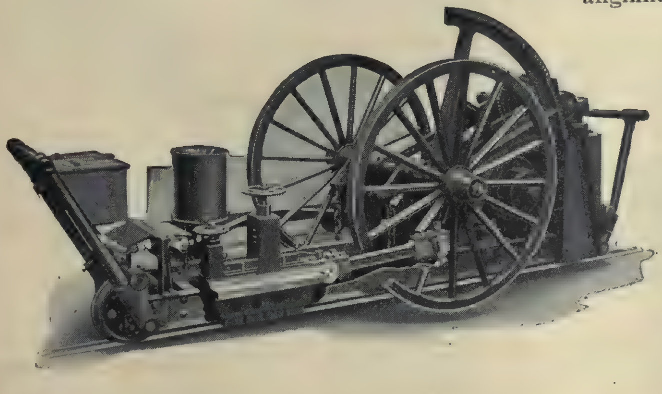
for grinding out bad spots and keeping rails smooth you can add to your present methods the cost of equipment and labor for that purpose

Without Adding to Your Annual Cost per Mile

Cupped joints and corrugations are not damaging merely to the rail and rolling stock. They also are the direct cause of much damage to the *track structure itself*.

The tremendous shock of cars passing at normal speed over such bad spots causes breaks and rapid deterioration of foundations, loosens bolts and joints, throws track out of alignment.

Consequently, if such spots are consistently cared for and ground out *before* they develop to a serious stage the result is a direct saving of much of the repair work necessary on foundations, joints, realignment of track and replacement of ties.



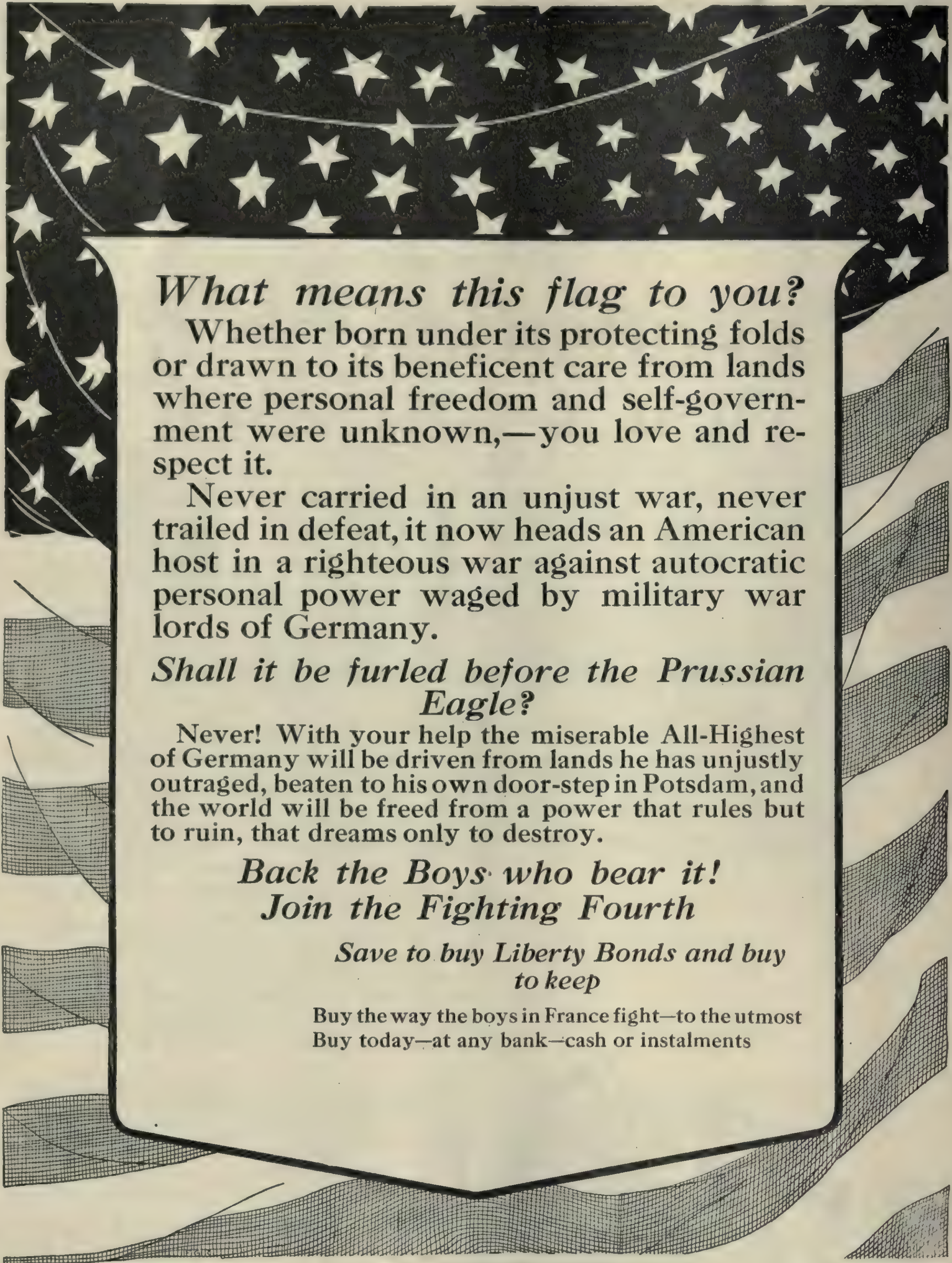
The use of Reciprocating Grinders, therefore, not only insures longer life of rail, smoother running of cars, decrease of wear on car equipment by elimination of shocks, but by removing the direct cause for much of the damage to *track structures* it decreases instead of adding to the total cost of track maintenance.

That is the experience of the hundred or more companies that use these efficient machines.

Railway Track-work Company

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.



What means this flag to you?

Whether born under its protecting folds or drawn to its beneficent care from lands where personal freedom and self-government were unknown,—you love and respect it.

Never carried in an unjust war, never trailed in defeat, it now heads an American host in a righteous war against autocratic personal power waged by military war lords of Germany.

Shall it be furled before the Prussian Eagle?

Never! With your help the miserable All-Highest of Germany will be driven from lands he has unjustly outraged, beaten to his own door-step in Potsdam, and the world will be freed from a power that rules but to ruin, that dreams only to destroy.

Back the Boys who bear it!
Join the Fighting Fourth

Save to buy Liberty Bonds and buy to keep

Buy the way the boys in France fight—to the utmost
Buy today—at any bank—cash or instalments

SHALL THEY GIVE IN VAIN?

By Kathleen McAlister, Belmont, Mass.

The Star Spangled Banner is waving in France,
Is fighting, and dying, and winning the cause,
And thrice has it called for a broadsword and lance,
For grim is the struggle with never a pause.

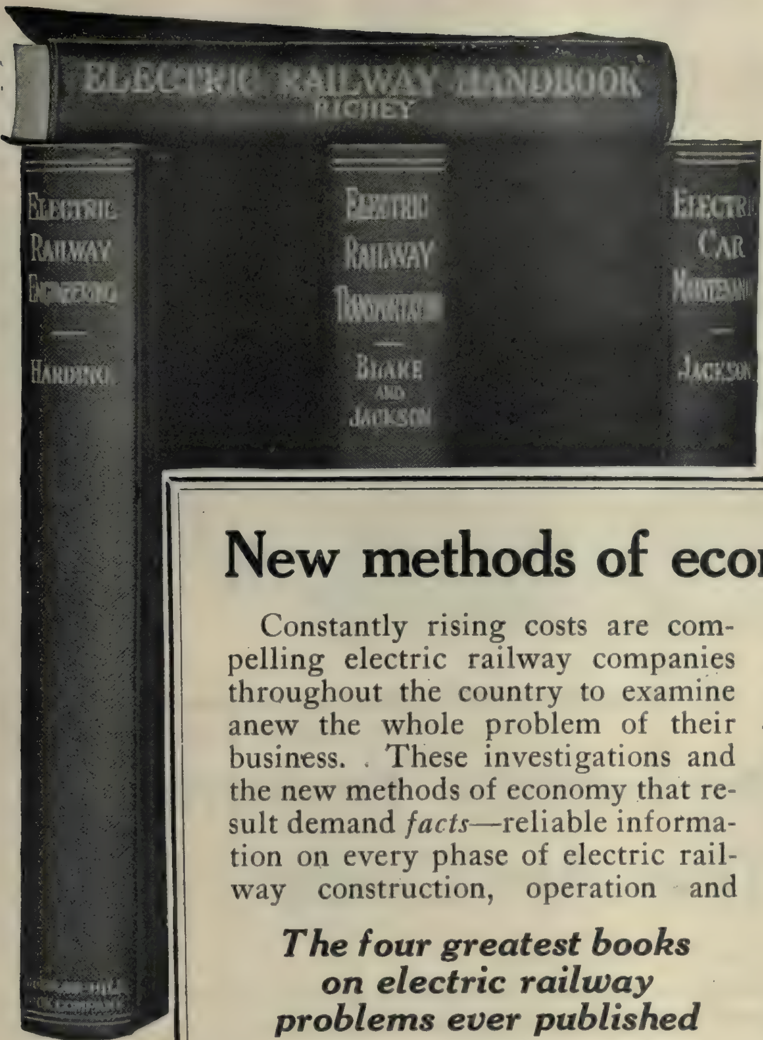
O long may it wave! Where the hosts are enrolled
To fight for the right, it is ever unfurled.
We'll forge it a weapon of silver and gold
That will banish the Brute and his lust from the world!

O'er the land of the free has the call thundered forth:
"Sweet Freedom's in peril! To arms! To the fray!"
And the sons of the south and the sons of the north
Are singing, and cheering, and marching away.

And the home of the brave must be steady and true,
The combat is mortal, and grievous the pain;
They are giving their manhood for me, and for you:
For lack of our money, shall they give in vain?

This space donated to winning the War by

ELECTRIC RAILWAY JOURNAL


ELECTRIC RAILWAY HANDBOOK
RICHEY
ELECTRIC RAILWAY ENGINEERING
HARDING
ELECTRIC RAILWAY TRANSPORTATION
BLAKE AND JACKSON
ELECTRIC CAR MAINTENANCE
JACKSON

An Electric Railway Library

New methods of economy demand facts

Constantly rising costs are compelling electric railway companies throughout the country to examine anew the whole problem of their business. These investigations and the new methods of economy that result demand *facts*—reliable information on every phase of electric railway construction, operation and maintenance. Complete data of this kind—based on the experience of four of the biggest electric railway specialists—make up the ELECTRIC RAILWAY LIBRARY. This library is helping thousands of electric railway men in meeting the perplexing new demands. It can help *you*.

The four greatest books on electric railway problems ever published

If you believe in making use of the experience of others, these books can be of great service to you. They present more information about electric railways than any one man could gather in a lifetime of experience. They abound in methods and devices that have proved successful in cutting costs and increasing efficiency for others.

Examine these books for 10 days FREE

We are so convinced of the value of this library that we invite you to use the books for 10 days *free*. You merely agree to return the books, postpaid, within 10 days of their receipt or to remit $3.00 and $3.00 each month thereafter for four months until the total price of $15.00 is paid. There is no string to this offer. See the coupon.

What the books cover

The one book—the handbook—is pocket size with flexible binding, so that it may be carried about conveniently. It is an encyclopedia of electric railway construction, operation and maintenance.

Electric Railway Engineering is a thorough and practical manual on the broader engineering problems.

Electric Railway Transportation covers the business side of the subject—the relation of traffic to profits. It is packed full of priceless information on traffic conditions, their causes and their relation to electric railway efficency.

Electric Car Maintenance has saved money for hundreds of companies that have purchased it. It is a complete treatment of this subject.

No money down.

Small monthly payments.

See the coupon.

Be a sceptic—see the books for yourself →

**McGRAW-HILL
BOOK CO., Inc.
239 West 39th St., New York**

Free Examination Coupon

McGraw-Hill Book Co., Inc., 239 West 39th Street, New York.

You may send me the Electric Railway Library for my inspection. If the books prove satisfactory, I will send $3.00 in 10 days and $3.00 per month for four months—until I have paid the price of the books—$15.00. If the books are not what I want, I agree to return them postpaid within 10 days of receipt.

....I am a subscriber to the Electric Railway Journal.

....I am a member of the A.I.E.E. or the A.E.R.A.

Signed ....

Address ....

Reference ....

(Reference is not required of subscribers to the Electric Railway Journal or members of the A.I.E.E. or the A.E.R.A. Books sent on approval to retail customers in the U. S. and Canada only.) E10-12-18

Pouring Forth Our Earthly Treasures For Treasures That Are Godly.

WEALTH and treasure are material estate. They are the heritage of diligence and good fortune.

But life, liberty and happiness are above all these. They are the possessions of Heaven which God alone bestows, and only He may rightfully take away.

So it is fitting and natural, when a sanguinary power, conceived in cunning and nurturad upon blind submissiveness, challenges the very right of God, that the world should turn in wrath against such blasphemy.

Wealth and treasure are this land's possessions. We are proud to think that this is largely so because the divine principles upon which life, liberty and happiness are predicated have been in diligence and good fortune our earnest precepts.

But as this great estate was in the making, we had no dreams of a day when we might pour forth this wealth and treasure for treasures far more godly.

It is today our privilege to do this, without reserve, unstintingly. And it is our privilege to see this wealth and treasure go forth hallowed by its own great purpose —for it expends itself not for selfish gain nor mean advantage, but that men throughout the world may hereinafter dwell in peace, secure in the knowledge that the life, liberty and happiness given them by God, may not, at the whim of some perverted human agency, be ruthlessly snatched away.

And so as you inscribe your name upon a subscription blank for Liberty Bonds to-day, your hand pours forth the treasure of the land, which returning will bring back with it fourfold the treasures of Heaven, life, liberty and happiness, and the gratitude of men saved from servitude and degradation.

BUY UNITED STATES GOVERNMENT BONDS
OF THE FOURTH LIBERTY LOAN

Written by I. R. Parsons

This Space Contributed to Winning the War by

W. R. Kerschner Co., Inc.
50 Church St., New York

The cars of the Grand Rapids Railway are equipped with Johnsons.

Johnson Metal Tickets are being generally adopted to relieve fare collection problems, take care of fare increases, etc.

Johnson Fare Boxes Get ALL the Fares

They insure a 100% fare collection for the railway company because the passenger deposits his own fare in the box. The conductor is a "change maker" instead of a fare collector, thereby eliminating the incentive for dishonesty.

Johnson Fare boxes give the conductor more time to attend to his other duties—insuring greater safety to passengers, allowing him to get cars off quickly, and saving time and money for the company.

They provide a flexible system of fare collection, handling cash, cash tickets, commutation or passes, recording each with absolute correctness.

More than 10,000 Johnson Fare Boxes are in use on prominent railways today. Let us send you full information about this efficient system of fare collection.

Johnson Fare Box Co.
Jackson Blvd. & Robey St., Chicago
50 East 42nd St., New York.

General [illegible] replied unhesitating
"My own."

Mortally Wounded,
He Cries 'Forward!'

PARIS, Aug. 1—Captain Francis O. Leahy, of Lawrence, Mass, formerly an orderly with General Pershing's staff in the Philippines, has been killed in Fere Forest.

A splinter of shell was driven through his back, coming out of his chest. He staggered, but held up his head, and, turning to Lieutenant Hanson, next in command, said.

"Lieutenant Hanson, the order is 'Forward!'"

"Forward!"

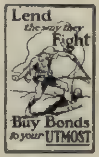
IN the fierce fighting in Fere Forest, a splinter of shell suddenly found his brave heart. Staggering, mortally wounded, yet with his head held high, he turned to the fighting man next in command with these words: "Lieutenant, the order is 'Forward!'"

Could the voices of our million fighting men send one splendid clarion call, one ringing message of encouragement across the sea to us, it would be that triumphant challenge of the young Captain who saw, even on the threshold of death, the glorious vision of Victory.

The order is "Forward!" We who toil in office, in factory and in field are essential to Victory. We are the support troops without which the war cannot be won. And the order is "Forward!"

Let us open our hearts to the message. Let us go forward with them to Victory.

Let us buy Liberty Bonds—
to our utmost!



This space contributed to winning the war by

AMERICAN BRAKE SHOE & FOUNDRY CO.
30 Church Street, New York

THE Lincoln Bonding Machine is a traveling repair shop. Under present conditions worn and broken parts have to be used until new parts can be received.

The quickest and simplest way is by the use of a Lincoln Bonding Machine.

Any and all kinds of metallic and carbon welding made easy.

The Lincoln Bonding Machine is the lightest and most efficient machine today.

This is the bond that when welded to your rail joint shows a saving of 25-35 cents per bond. We prove this saving over any other method.

THE LINCOLN BONDING CO.
636 Huron Road, Cleveland, Ohio

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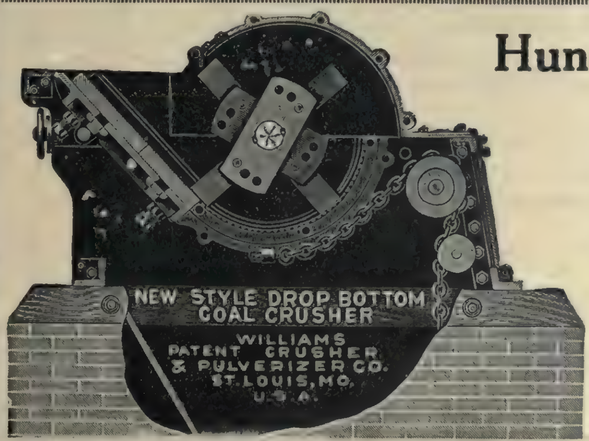

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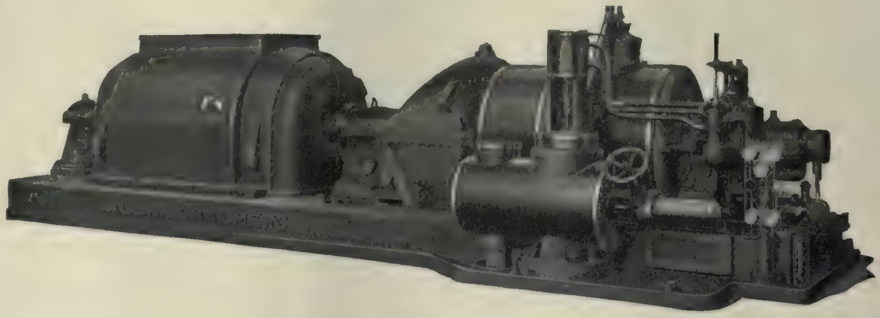

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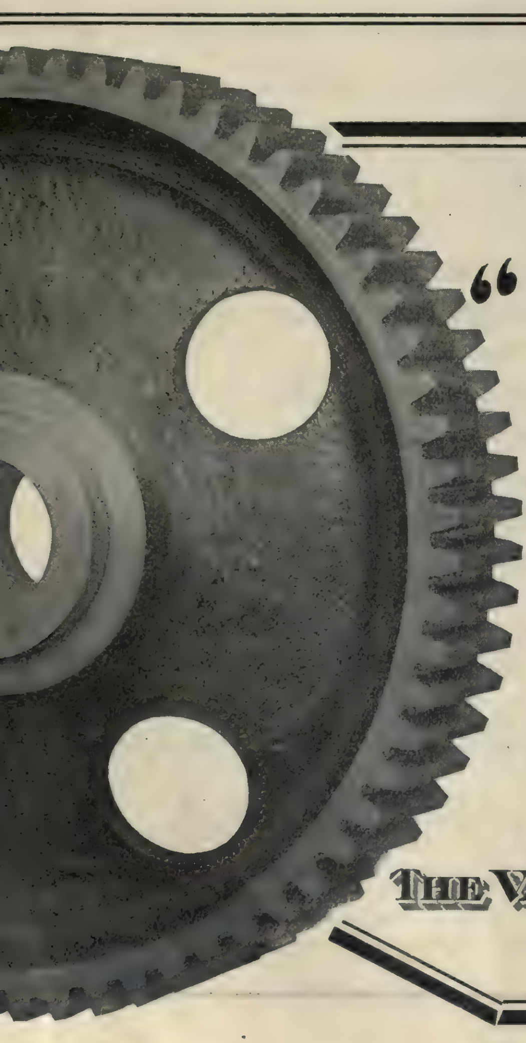

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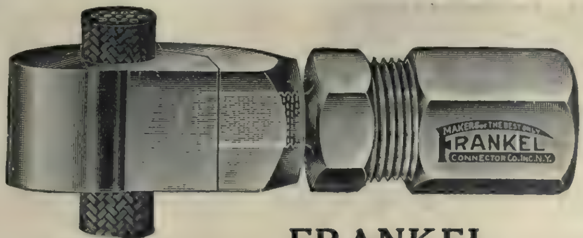

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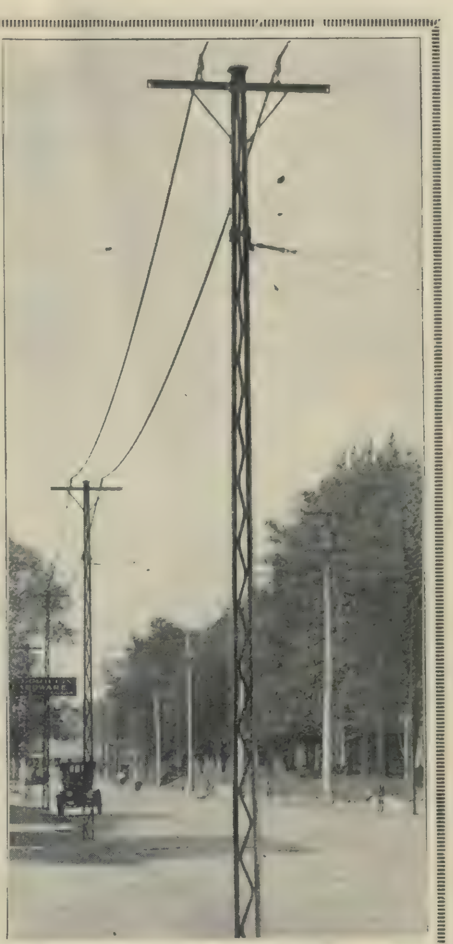

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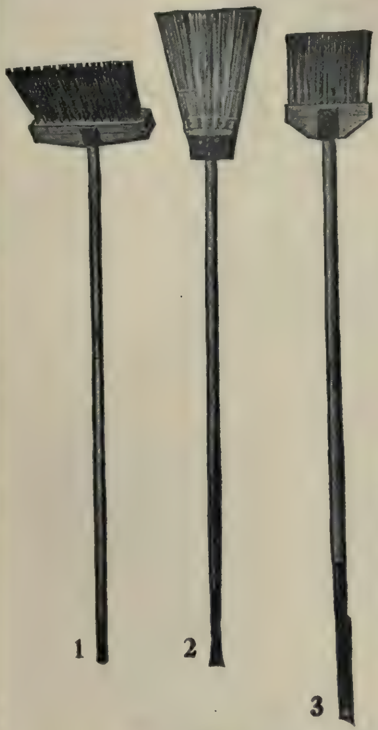

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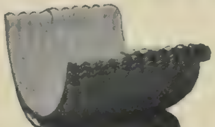

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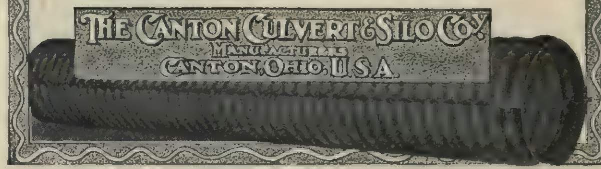
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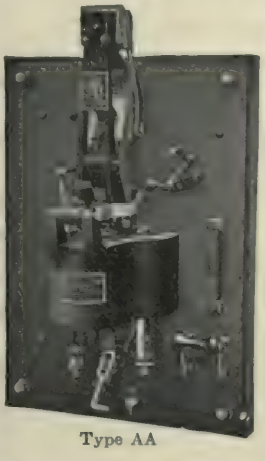

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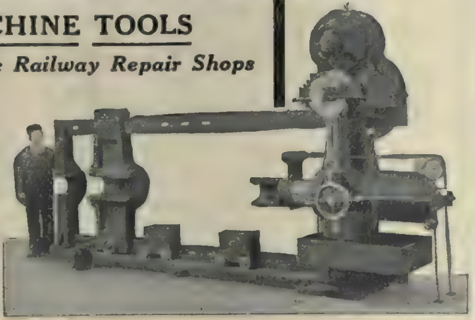

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"THIS IS THE LAST OF WARS"

Coming in splendor thro' the Golden Gate
Of all the days, swift passing, one by one,
Oh, Silent Planet, thou hast gazed upon
How many harvestings, dispassionate?
Across the many-furrowed fields of fate,
Wrapt in the mantle of oblivion,
The old, gray, wrinkled husbandman has gone
Sowing and reaping, lone and desolate—
The blare of trumpets, rattle of the drum,
Disturb him not at all—he sees,
Between the hedges of the centuries,
A thousand phantom armies go and come,
While Reason whispers as each marches past,
"This is the last of wars,—this is the last!"

LIEUT. GILBERT WATERHOUSE
(*Wounded and missing, July 1, 1916*).

MAKE it the last! Save every dollar you can and dig deep into the work of war. Pour out your resources—hold back no single dollar that can help make the victory FINAL. Make this "The Last of Wars!"

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If Everybody In This Country Said

Lend the way they Fight
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"I'd like to buy more Liberty Bonds *but*—"

Who Would Win This War?

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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for One-Man Safety Cars and for heavy city service.

Only four parts—Steel Aisle End Support, Steel Wall End Support, hardwood framed Rattan Cushion, framed Rattan Back. Note new yokeless pedestal.

The No. 108 is only One-half the Weight of Seats with Iron Castings.

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"It Behooves You to Hooverize Your Motormen"

We can help you

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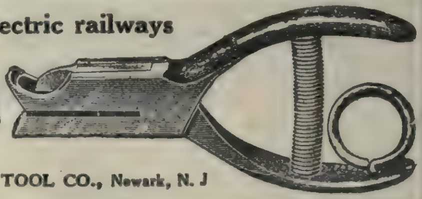

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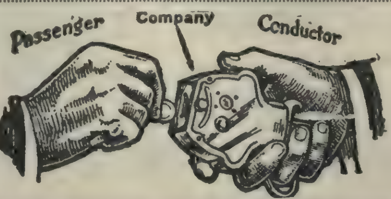

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The "Hycap-Exide" Battery

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STORAGE BATTERY STREET CARS

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is a necessity and the heating and ventilating of street cars should be accomplished the most economical way. Our Hot Air Forced Ventilation Equipment combines heat with ventilation at a saving of 50% to 70% over electric heat.

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International Specialties Cover the Entire Range of Fare Collection

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Colored lights are notification to those following of the movement of the car's controller. Helps avoid rear-end accidents; avoids delays of cars behind. Used on leading railways.

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3—500-kw. General Electric, 3-phase, 25-cycle, Type HC, Form K, 600 volts D.C., 750 r.p.m. With each rotary there are suitable switchboard panels and three 165-kva. Gen. Elec. OI SC Type HR transformers, 6600/5940 volts prim., 430/286/143 volts sec.

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1—400-kw. General Electric, 6-phase, 25-cycle, type HC, Form P, 600 volts D.C., 430 volts A.C., 900 r.p.m.

MACGOVERN & COMPANY, Inc.
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1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.

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1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

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Five (5) NEW Double

TRUCK CARS

Length 45 ft. 0 in. Equipped with 4 G. E. Co.'s 247 Motors and G.E. Co.'s Air Brakes. For delivery October 15th, 1918.

Two (2) Double

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Lengh 44 ft. 6 in. Equipped with 4 G. E. Co.'s 203 Motors and Air Brakes. Immediate Delivery.

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Cars and Trucks—Snow Sweepers
Electric Locomotives
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Single Track Steel

TROLLEY TRESTLE

720 ft. long.

1 Double Truck, Double End

SNOWPLOW

Equipped.

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Complete

10 K-11, K-6, K-8 Controllers.
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3—32 ft. Closed

Complete with equipment. *First-Class.* Could be converted to one-man type.

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60 Tons

7-in Girder Rails

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Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

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OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full Particulars to

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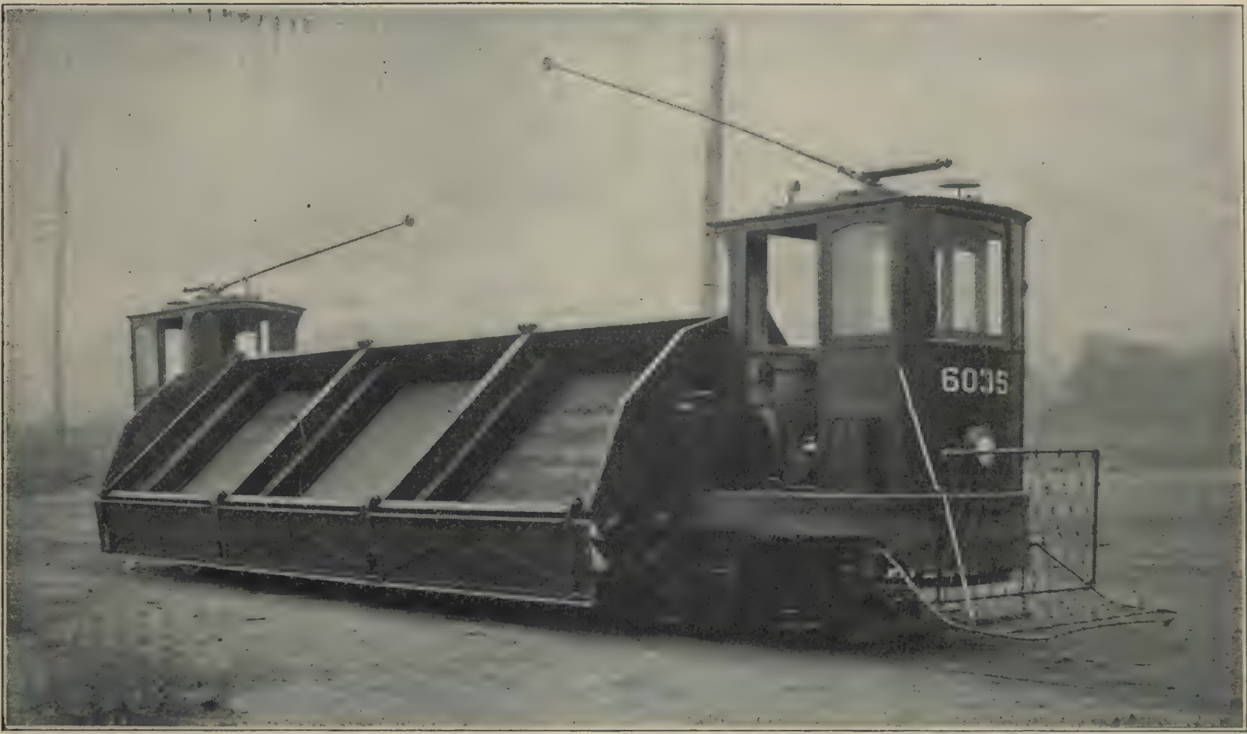
601 Commonwealth. Bldg. Phila. Pa.

An Unusual Opportunity

12 New Differential Dump Cars for Sale



For Immediate Delivery

These cars are 40 ft. 6 in. in length over-all, 8 ft. 2 in. wide. The main portion of the car consists of a tilting body with three compartments, having a capacity of 6.8 cu.yds. each, or a total capacity of approximately 20 cu.yds. The dumping of the compartments is provided through an electrically driven worm. These cars are of all-steel construction, supplied with a motorman's cab at either end and arranged for double end operation.

The cars are double truck, being mounted upon a pair of M. C. B. trucks, 5 ft. 10 in. wheel base, supplied with 30-in. wheels.

The electrical equipment consists of four (4) West. 306 C. V. Interpole Box Frame Motors of 65 H.P. each. Cars are supplied with both hand and air brakes. The air brakes are Westinghouse S. M.-3. The weight of these cars is as follows:

Body	**approx.**	**24,650 lb.**
Trucks	"	**13,000 lb.**
Elec. Equip.	"	**12,200 lb.**
Air Brakes	"	**1,800 lb.**
Total		**51,650 lb.**

The Ellcon Company, 50 Church St., New York

COMPLETE POWER HOUSE OUTFIT

The Oklahoma Railway Company of Oklahoma City

is changing over its plant to 60 cycle, and therefore has for release and sale the 25-cycle equipment listed below. The Turbo-Generator and half of the sub-station equipment can be shipped at once; the remainder about March 1st. Address all communications to

G. B. TREAT, Assistant Plant Manager,
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GENERATING EQUIPMENT

No. 1 Unit.

Filer and Stowell, cross compound, horizontal condensing Corliss engine, 26 in. x 52 in. x 48 in., 83½ r.p.m., complete with C. H. Wheeler, 3000 sq.ft. surface condenser, Mullen's wet vacuum pump, 8 in. x 16 in. x 12 in., and motor-driven 10 in. centrifugal circulating pump.

Engine direct connected to

Westinghouse, Engine Type, 3 phase, 25 cycle, 380 volt, 860 kw. generator, complete with switchboards and instruments.

No. 2 Unit.

Westinghouse-Parsons Steam Turbine, 1500 r.p.m., complete with

C. H. Wheeler 3000 sq.ft. surface condenser, Mullen's wet vacuum pump, 8 in. x 16 in. x 12 in. and 8 in. x 9 in., vertical piston valve steam engine driven, 12 in. centrifugal circulating pump, 250 r.p.m.

Turbine direct connected to

Westinghouse 3 phase, 25 cycle, 380 volt, 850 kw., 1500 r.p.m. generator, with direct connected 18.5 kw., 125 D.C. volt exciter, and complete with switchboards and instruments.

TRANSFORMER AND SUB-STATION EQUIPMENT

1—300 kw., 600 D.C. volt, 3 phase, 25 cycle, 500 r.p.m., synchronous converter.
4—400 kw., 600 D.C. volt, 3 phase, 25 cycle, 500 r.p.m., synchronous converter.
1—500 kw., 600 D.C. volt, 3 phase, 25 cycle, 750 r.p.m., synchronous converter.
Converters are complete with field rheostats, A.C. and D.C. switchboard panels, instruments, etc.
1—180 hp., 500 volt, 525 r.p.m., shunt wound D.C. motor, direct connected to 120 kw., 200 volt D.C. booster.
7—300 kva., 16,500/380 volt, single phase, 25 cycle transformers.
9—150 kva., 16,500/380 volt, single phase, 25 cycle transformers.
3—100 kva., 16,500/380 volt, single phase, 25 cycle transformers.
1—Set 16,500 volt, 3 phase, electrolytic lightning arresters.
2—Sets 16,500 volt low equivalent lightning arresters
1—Set 33,000 volt low equivalent lightning arresters (new).
3—Sets 16,500 volt pancake type choke coils.
1—Set 33,000 volt fuse type disconnecting switches.
4—Sets 165,000 volt disconnecting switches.
3—3 P. S.T., 300 amp., 16,500 volt, mech. operated remote control, cell mounted, automatic oil circuit breakers, complete with control panels, necessary current transformers, etc

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Western Electric Galvanized Seven Wire Steel Strand

500,000 ft.

1/4" 5/16" 3/8" 7/16" 1/2"

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Offered subject Robert W. Hunt & Co. or other inspection.

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the equipment or machinery that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it *Before* depreciation *Scraps* it.

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805

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85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
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Rails cut to lengths for structural purposes.
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Approximately 20 miles 500,000 C.M. and 4 miles 350,000 C.M. triple and double weatherproof stranded cable now being removed. Insulation and wire in good condition for reinstallation.

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W. C. Slade, Supt. of Power and Lines.

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8000 ft. 900,000 C.M Single Conductor, 61-Wire, 3/32 Rubber, Triple Braid, 600-Volt

CABLE

This is used material but in good second-hand condition, in lengths of 300 to 450 ft. each.

Price $1.00 per ft.

The Connecticut Light & Power Co.
WATERBURY, CONN.

1—G. E., Type H.R., Form K, 60-cycle

TRANSFORMER

65 kva., 2200/1980 volts, to 370/185. Never been connected; ready for shipment.

Charlottesville & Albemarle Railway Co.
CHARLOTTESVILLE, VA.

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Locomotives—Cars—Tanks
Machinery, Piling, etc.

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FOR SALE

STREET RAILWAY POWER PLANT

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Complete list of apparatus may be had by addressing the

EASTERN WISCONSIN ELECTRIC CO.
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[1] **American Machinist**
[2] **Coal Age**
[3] **Electrical World**
[4] **Electrical Merchandising**
[5] **Electric Railway Journal**
[6] **Engineering and Mining Journal**
[7] **Engineering News-Record**
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[9] **Power**

Each of these 9 papers is the leading periodical of the industry it serves.

Searchlight advertisements will get you in touch with the important men of these important industries.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1918.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared James H. McGraw, Jr., who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Co., Inc., Publishers of of the Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the name and addresses of the publishers, editor, managing editor, and business managers are: Publisher, McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York City. Editor, Henry W. Blake, 10th Ave. at 36th St., New York City. Managing Editor, None. Business Manager, L. W. Seeligsberg, 10th Ave. at 36th St., New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.) McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York, N. Y. James H. McGraw, 10th Ave. at 36th St., New York, N. Y. Arthur J. Baldwin, 10th Ave. at 36th St., New York, N. Y. John McGhie, 10th Ave. at 36th St., New York, N. Y. Fred R. Low, 10th Ave. at 36th St., New York, N. Y. Henry W. Blake, 10th Ave. at 36th St., New York, N. Y. Leonard D. Baldwin, 27 Pine St., New York, N. Y. Martin M. Foss, 239 West 39th St., New York, N. Y. Edward Caldwell, 239 West 39th St., New York, N. Y. F. S. Weatherby, 163 Clinton Road, Brookline, Mass. Arthur J. Baldwin, 10th Ave. at 36th St., New York, N. Y., Trustee for Estate of John A. Hill. Morgan Baldwin, Donald Baldwin, Franklin Baldwin, Grace Baldwin, and Cynthia Haselton.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation; the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES H. McGRAW, Jr.,
Secretary, McGraw-Hill Co., Inc.

Sworn to and subscribed before me, this 20th day of Sept., 1918.

[SEAL.] MARTIN J. WIEMER.
NOTARY PUBLIC,
Kings County Certificate No. 103
Certificate filed in New York County No. 316
(My commission expires March 30, 1920)

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be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
1570 Old Colony Bldg., Chicago.
657 Leader News Bldg., Cleveland.
935 Real Estate Trust Bldg., Phila.
501 Rialto Bldg., San Francisco.
1100 Newhouse Bldg., Salt Lake City.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

POSITIONS VACANT

ASSISTANT General Manager wanted for large city and interurban electric railway; must be broad, able, experienced, strong, energetic man who will devote himself entirely and absolutely to the economical, efficient operation of road and property. P-259, Elec. Ry. Journal, Philadelphia.

BOILER room foreman and fireman wanted, good position open for boiler room foremen and firemen in large central plant running B. and W. boilers and Taylor stokers, pay 55c. for boiler room foremen and 40c. to 42c. for firemen, eight hour shift per day. P-247, Elec. Ry. Journal.

SUPERINTENDENT wanted. Energetic, capable, general. By Interurban Railway in Middle West. Must know railroading and understand thoroughly electrical apparatus of all kinds usually used on electric railways. Must be able to handle men. State age, previous experience, references and salary expected. P-257, Elec. Ry. Journal, Chicago.

POSITIONS WANTED

AUDITOR, secretary or treasurer of interurban road; 15 years' experience: fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. PW-247, Elec. Ry. Journal, Chicago.

ELECTRIC railway engineer, 31, class IV draft; general experience as M. of W. and electrical executive, desires position as chief engineer or assistant to busy executive. References. PW-256, Elec. Ry. Journal.

ENERGETIC, ambitious, 38 years old man, 15 years' experience in street railway transportation with large company. Thoroughly familiar with every detail of the department, including charting traffic, making and adjusting schedules and handling men, desires position as transportation superintendent. My record with present employer is proof of my ability. PW-258, Elec. Ry. Journal, Cleveland.

GENERAL manager of small road or executive to general manager; large experience in all departments, age 42; first-class references; bond furnished any amount. PW-248, Elec. Ry. Journal, Chicago.

MASTER mechanic desires position. Has maintained rolling stock on city, interurban and high speed railways. Can organize, systematize, standardize and put run-down equipment in good operating condition. Reference furnished. PW-254, Elec. Ry. Journal, Chicago.

OPERATING and Constructing manager, city and interurban railways, desires new connection. Salary $3600 per year. Carl H. Fuller, Box 1389, Mobile, Ala.

POSITION as master mechanic of either city or interurban railway. Have had extensive experience with high-class roads. Can maintain any kind of equipment in first-class condition. PW-252, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT of track and overhead; thoroughly competent; wants construction or maintenance position. Broad experience. References. Address B. J. Schram, 3450 Le Moyne Ave., Chicago, Ill

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Oxweld Acetylene Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Anchors, Guy
Electric Service Supplies Co.
Holden & White, Inc
Johns-Manville Co., H. W.
Ohio Brass Co.
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Axles, Car Wheel
Bemis Car Truck Co.
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Carnegie Steel Co.
National Railway Appliance Co.
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Standard Steel Works Co.
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Babbitting Devices
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Badges and Buttons
Electric Service Supplies Co.
International Register Co., The
Western Electric Co.

Batteries, Dry
Johns-Manville Co., H. W.
Nichols-Lintern Co.
Western Electric Co.

Batteries, Storage
Electric Storage Battery Co.
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Ajax Metal Co.
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Eureka Co.
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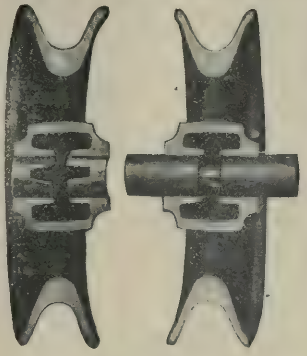

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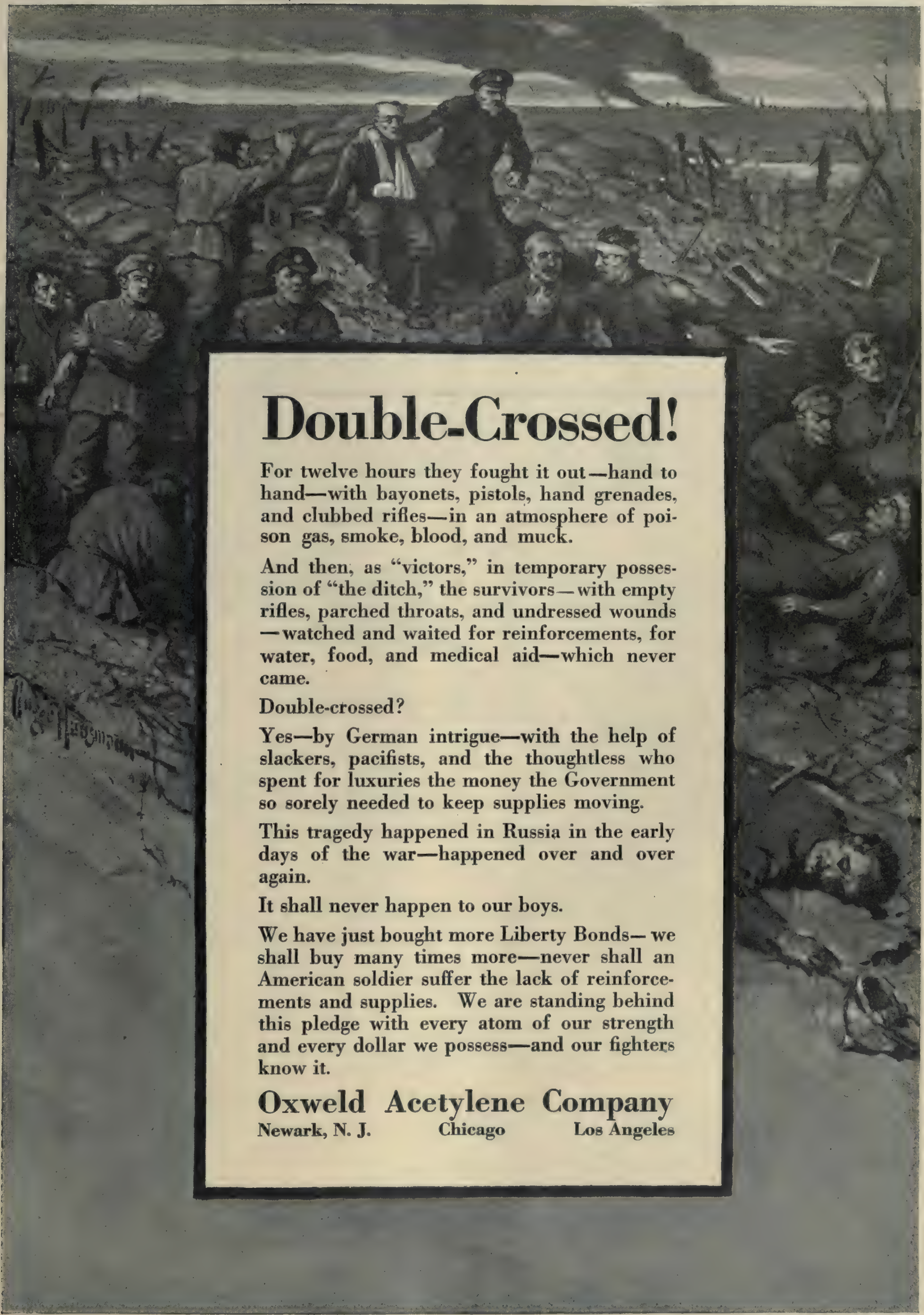
Scaife & Sons Co., Wm. B.



Double-Crossed!

For twelve hours they fought it out—hand to hand—with bayonets, pistols, hand grenades, and clubbed rifles—in an atmosphere of poison gas, smoke, blood, and muck.

And then, as "victors," in temporary possession of "the ditch," the survivors—with empty rifles, parched throats, and undressed wounds—watched and waited for reinforcements, for water, food, and medical aid—which never came.

Double-crossed?

Yes—by German intrigue—with the help of slackers, pacifists, and the thoughtless who spent for luxuries the money the Government so sorely needed to keep supplies moving.

This tragedy happened in Russia in the early days of the war—happened over and over again.

It shall never happen to our boys.

We have just bought more Liberty Bonds—we shall buy many times more—never shall an American soldier suffer the lack of reinforcements and supplies. We are standing behind this pledge with every atom of our strength and every dollar we possess—and our fighters know it.

Oxweld Acetylene Company

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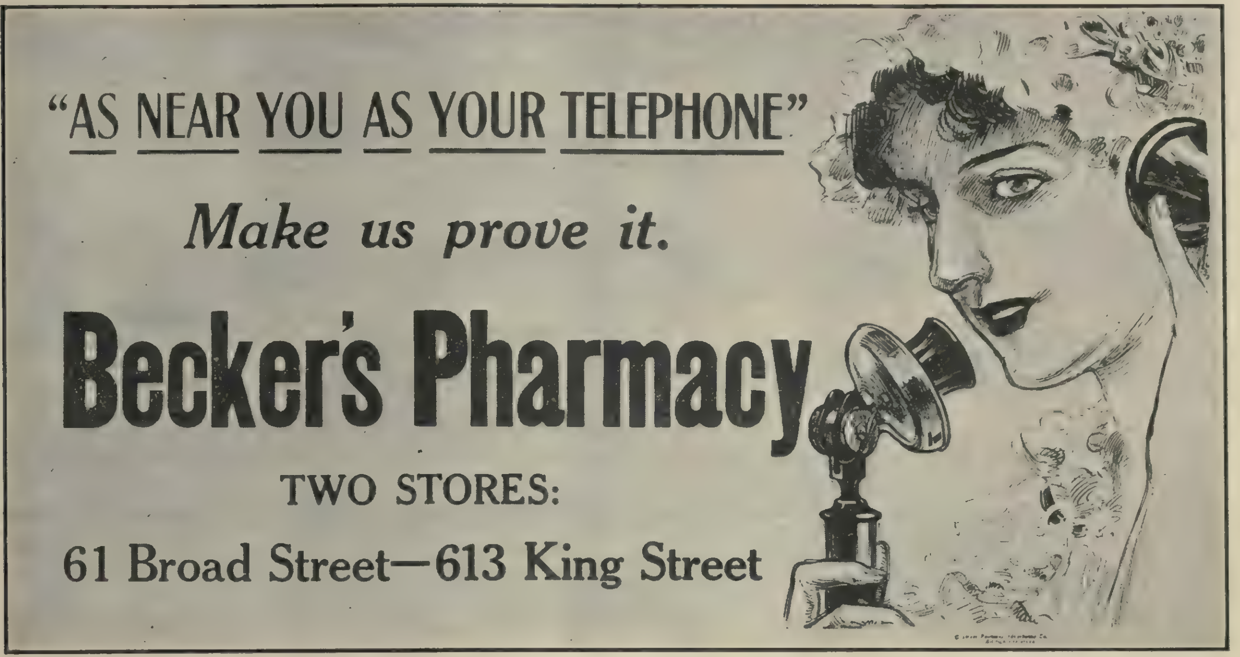

"AS NEAR YOU AS YOUR TELEPHONE"

Make us prove it.

Becker's Pharmacy

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There are a thousand and one Collier Car Cards whose artistic or literary appeal is applicable to many kinds of businesses in many kinds of places.

Thus the Collier Car Card showing a housewife at her telephone and bearing the legend "As near as your telephone" is just as helpful to the Charleston car card advertiser who uses it as to the tradesman further north.

Of course, only the nation-wide organization of Collier Service makes it possible to devise such telling cards. A local contractor could not afford to prepare them for a limited clientele. The cost must be divided among thousands if such service is to be given at all.

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INCORPORATED

Candler Building
220 West 42nd Street, New York City

The Boy From Next Door

YOU used to see him swing gaily down the street, radiant with the vigor of his sturdy young manhood. One day he came home in khaki; then his father told you, with mingled pride and foreboding, that he had "gone across" with his regiment.

Yesterday his name was on the casualty list—"slightly wounded"—and your face grew grave as you thought of the sorrow and suspense of his father and mother.

From every city street, every village, every community, the boy next door has gone to war.

Think of these thousands of splendid young Americans, reared in comfort, peace, and security, now suddenly plunged into that roaring inferno of battle with the hardened hordes of a desperately determined foe.

What are you doing to help them?

What are you doing to arm and protect them, and bring them home in safety? Have you bought Liberty Bonds? Have you bought all you possibly can?

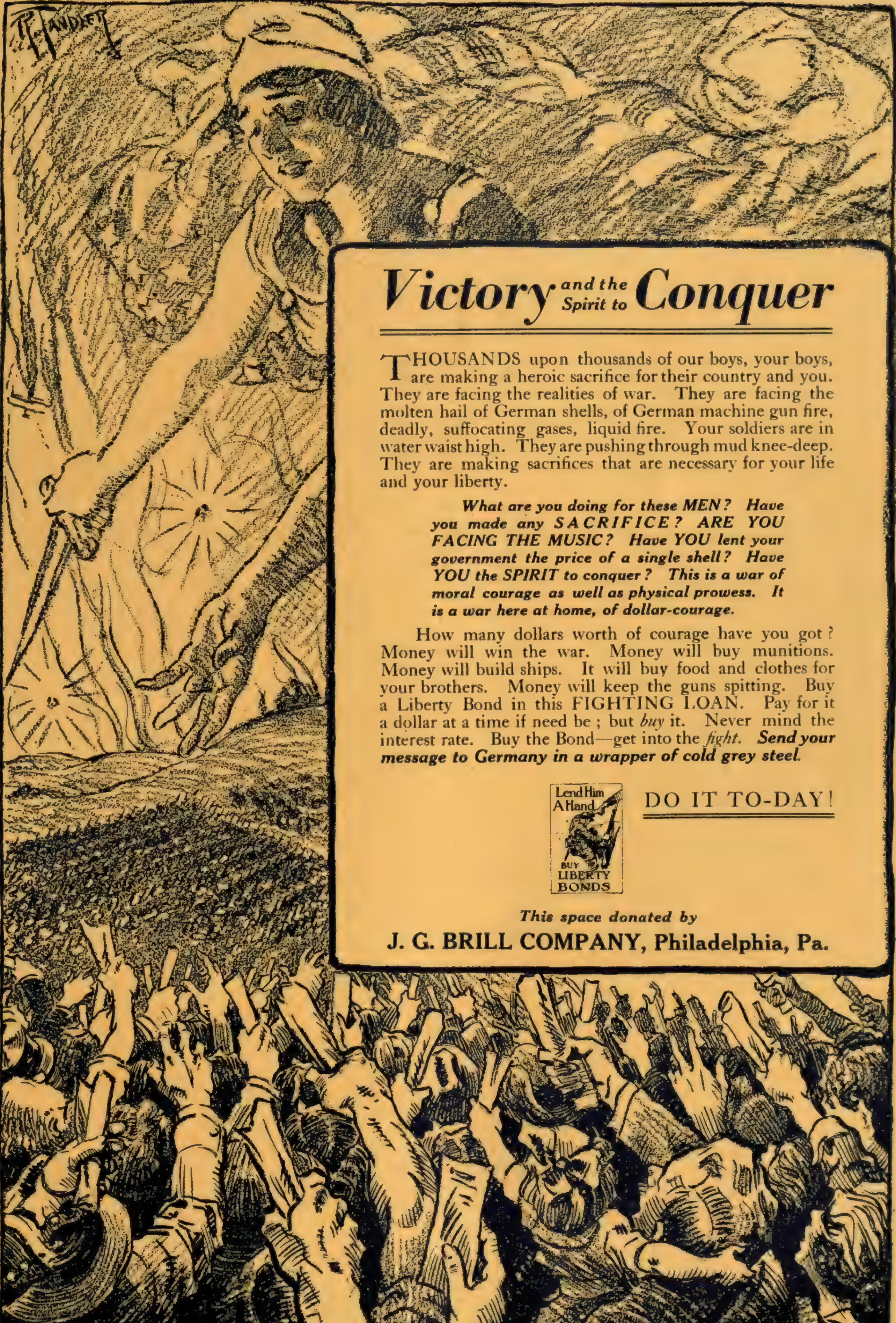
Has it occurred to you that one more Bond, bought with a little additional effort, may save the life of the boy from the next boor?

Buy *Another* Bond!

THIS SPACE SUBSCRIBED TO WINNING THE WAR BY

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



Victory and the Spirit to Conquer

THOUSANDS upon thousands of our boys, your boys, are making a heroic sacrifice for their country and you. They are facing the realities of war. They are facing the molten hail of German shells, of German machine gun fire, deadly, suffocating gases, liquid fire. Your soldiers are in water waist high. They are pushing through mud knee-deep. They are making sacrifices that are necessary for your life and your liberty.

What are you doing for these MEN? Have you made any SACRIFICE? ARE YOU FACING THE MUSIC? Have YOU lent your government the price of a single shell? Have YOU the SPIRIT to conquer? This is a war of moral courage as well as physical prowess. It is a war here at home, of dollar-courage.

How many dollars worth of courage have you got? Money will win the war. Money will buy munitions. Money will build ships. It will buy food and clothes for your brothers. Money will keep the guns spitting. Buy a Liberty Bond in this FIGHTING LOAN. Pay for it a dollar at a time if need be; but *buy* it. Never mind the interest rate. Buy the Bond—get into the *fight*. ***Send your message to Germany in a wrapper of cold grey steel.***

DO IT TO-DAY!

This space donated by

J. G. BRILL COMPANY, Philadelphia, Pa.

Every electrical engineering and manufactu lity of this company is being applied "without imit" to the vital business of winning the war

The Fourth Liberty Loan

AGAIN the Government comes to the people of the country with the request that they lend their money, and lend it upon a more liberal scale than ever before, in order that the great war for the rights of America and the liberation of the world may be prosecuted with ever-increasing vigor to a victorious conclusion. And it makes the appeal with the greatest confidence because it knows that every day it is becoming clearer and clearer to thinking men throughout the nation that the winning of the war is an essential investment. The money that is held back now will be of little use or value if the war is not won and the selfish masters of Germany are permitted to dictate what America may and may not do. Men in America, besides, have from the first until now dedicated both their lives and their fortunes to the vindication and maintenance of the great principles and objects for which our Government was set up. They will not fail now to show the world for what their wealth was intended.

Woodrow Wilson

Buy United States Government Bonds of the Fourth Liberty Loan

**The time to win the war is NOW. It will take money.
Unless it is won everything you possess is lost!**

95-50-G

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ELECTRIC RAILWAY JOURNAL

October 19, 1918

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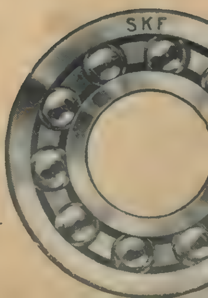

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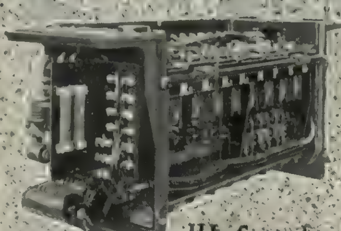
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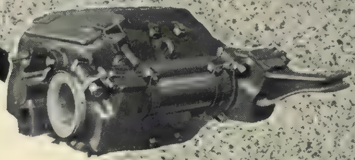
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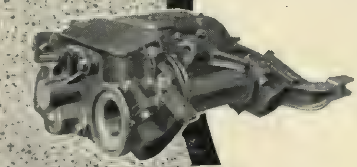
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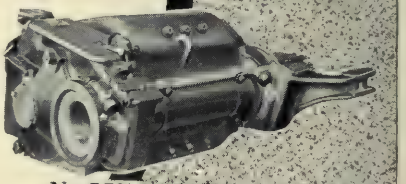
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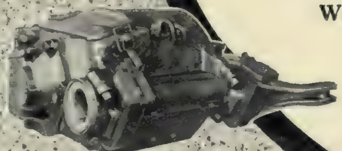
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Productive efficiency, as well as economy, for both railway company and manufacturer are secured by establishing standards.

Everybody is now familiar with the reliable standards adopted by the Westinghouse Company for the past several years.

There are seven standard sizes in railway motors, as shown in the illustrations, ranging from motors for the small safety car, up to those for high-speed interurban cars.

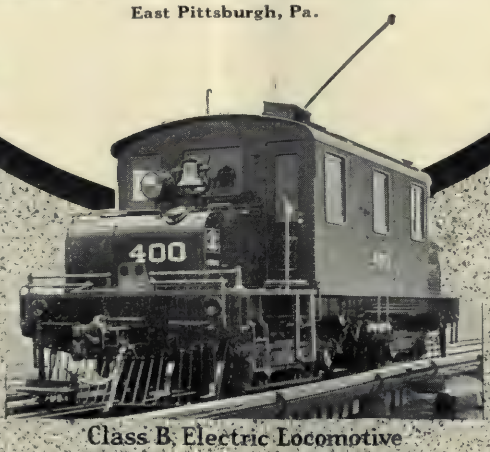
HL Control is now, and has been, our standard for several years—It has no equal.

Our Standard Electric Locomotives are:

Class A, 25 to 35 tons
Class B, 35 to 40 tons
Class C, 40 to 45 tons
Class B, 45 to 60 tons

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

W
WESTINGHOUSE ELECTRIC



Class B, Electric Locomotive

Westinghouse

Vol. 52, No. 16 New York, October 19, 1918 Pages 683 to 724

Electric Railway Journal

H. W. BLAKE, *Editor*

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McGRAW-HILL COMPANY, INC., 10th Ave. at 36th Street, NEW YORK

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More Shells—Fewer Casualties

BACK of every war activity lies—coal. Ships, shells, guns, transportation. For all these we must have—coal.

The more coal, the more shells with which to destroy the machine-gun nests of our enemies—and thereby save the lives of our own boys. The larger the supply of coal—the shorter the war and fewer casualties.

Our annual output of coal has increased a hundred million tons since we went into the war, while no other nation has even been able to maintain its output during the war.

Another fifty million badly needed tons can be saved—to help shorten the war.

Save coal.

Close up the unused rooms and turn off the heat. Put on storm doors and windows—put them on early. See to it that the weather strips fit.

Don't heat your home above 68°. A higher temperature is unhealthy, anyway.

Burn wood where you can.

Keep an eye on the furnace—don't leave it all to "the man."

If you feel that one shovelful of coal won't make any difference—think of it as a shell for the boys over there.

If you find yourself burning two lights when one will do—turn one out.

You, who have bought bonds and thrift stamps, you who have given of your money for war charities, given until you have felt the pinch, you whose sons and neighbors' sons are over there, will you not give up, too, just a bit of lazy, enervating comfort to help hurry along the job those brave boys have tackled?

Save light and heat, save coal.

To learn to operate your furnace efficiently, get from your local fuel administrator a leaflet entitled "Save Coal in the Home."

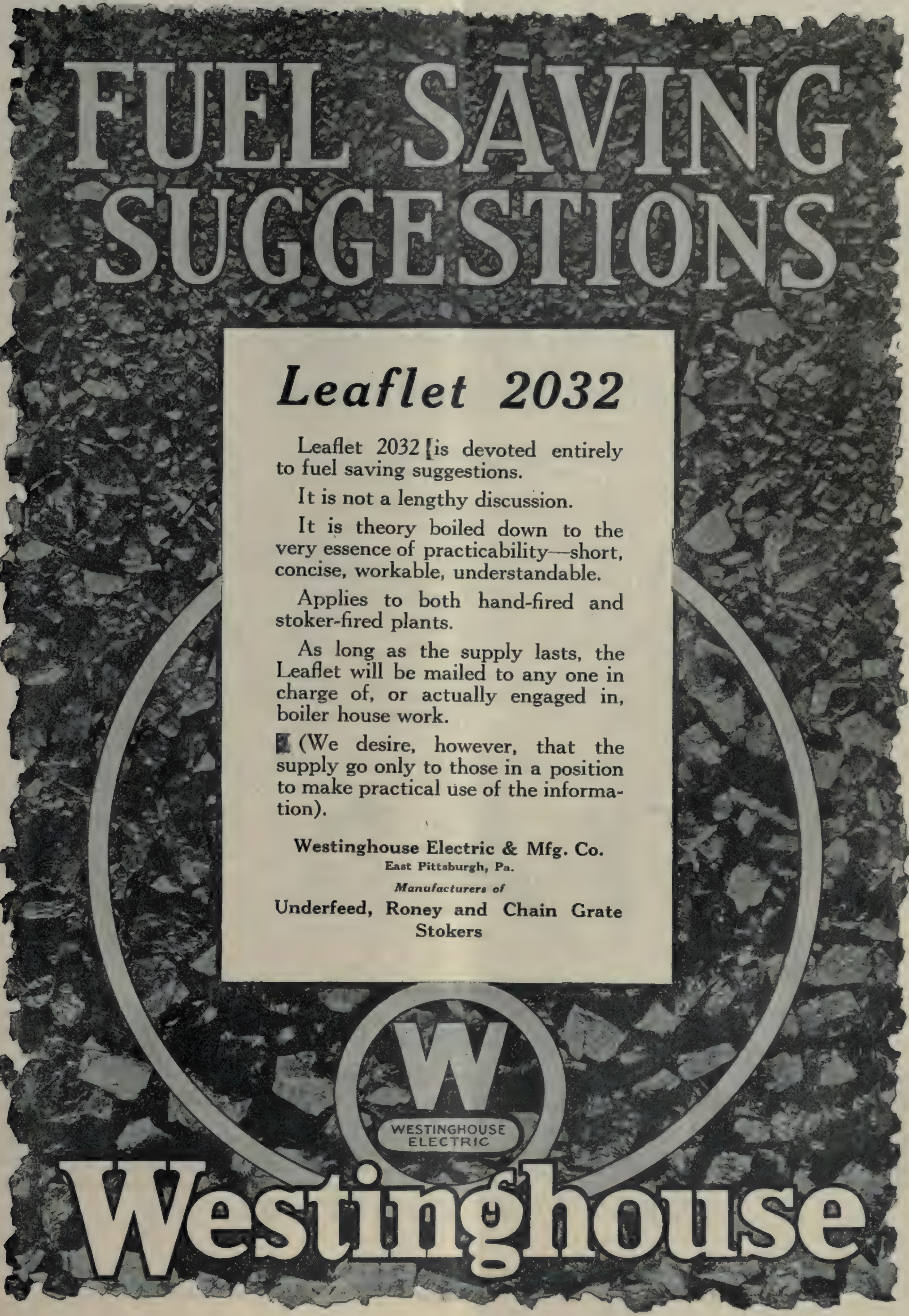
UNITED STATES FUEL ADMINISTRATION

Contributed Through Division of Advertising

United States Gov't Comm. on Public Information

This space contributed for the Winning of the War by

WESTINGHOUSE TRACTION BRAKE CO.



FUEL SAVING SUGGESTIONS

Leaflet 2032

Leaflet 2032 is devoted entirely to fuel saving suggestions.

It is not a lengthy discussion.

It is theory boiled down to the very essence of practicability—short, concise, workable, understandable.

Applies to both hand-fired and stoker-fired plants.

As long as the supply lasts, the Leaflet will be mailed to any one in charge of, or actually engaged in, boiler house work.

(We desire, however, that the supply go only to those in a position to make practical use of the information).

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.
Manufacturers of
Underfeed, Roney and Chain Grate Stokers

Westinghouse

Hundreds in Stock

Make Your Winter Service Dependable

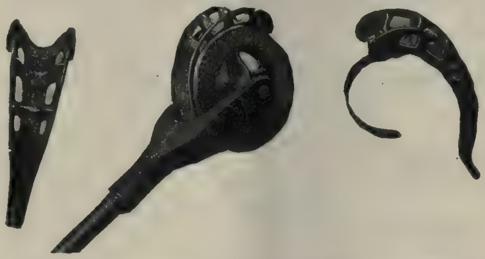
Use Nuttall Sleet Wheels and Scrapers

4¼ to 6-In. Dia. ½ to ⅝-In. Wheel Axle

WHEN Old King Winter covers your wires with a coating of ice, what is the result? Do your cars run on the usual schedule or is there a tie-up that extends over your entire system? Proper equipment will determine the result.

The proper equipment is Nuttall Union Standard Sleet Wheels and Scrapers. They keep your wires free from ice and are made in two sizes, 4¼-in. and 6-in.

ORDER NOW



R. D. NUTTALL COMPANY
Pittsburgh, Pa.

Nuttall Gears

EVERY GEAR REGISTERED

Tampa

has also applied the

Safety Car Control Equipment

to Two-man Cars

The labor-saving, time-cutting and safety-making merits of the Safety Car Control Equipment are by no means confined to one-man car operation.

For example, the Tampa Electric Company already operating the Safety Car has placed the same Safety Car Control Equipment on five 48-passenger cars in its Sulphur Springs semi-interurban service.

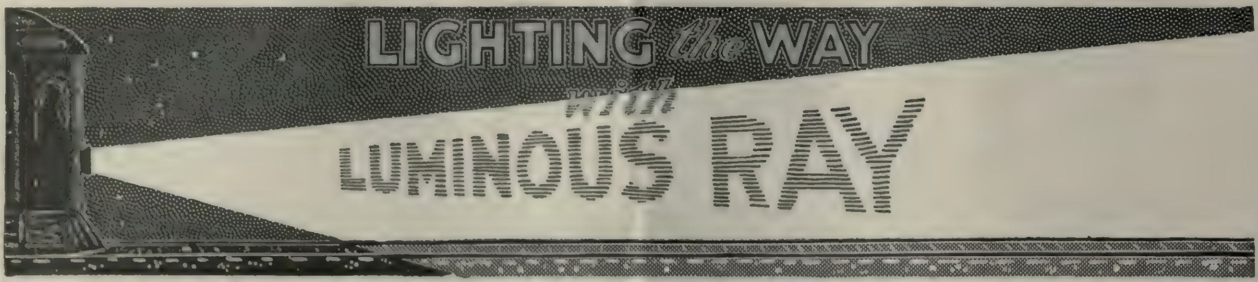
A Safety Car Control Equipment will pay on any of your large cars.

SAFETY CAR DEVICES CO.

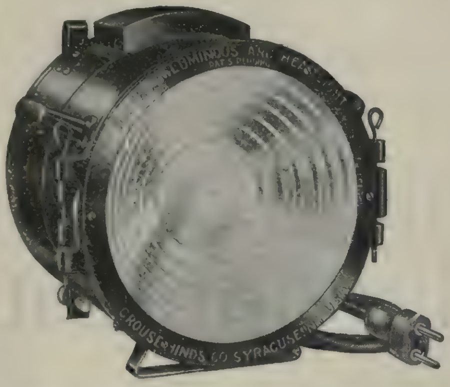
Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO	NEW YORK	PITTSBURGH
Railway Exchange Bldg.	City Invest. Building	Westinghouse Building

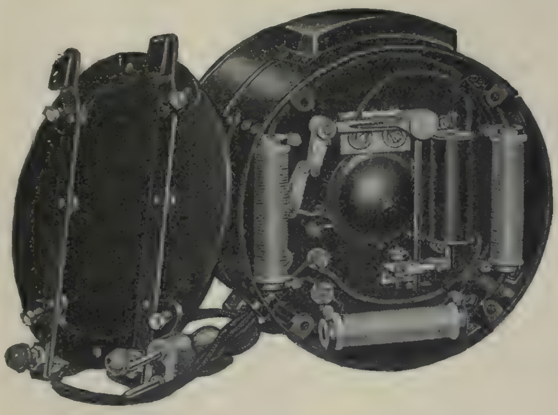
CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



A Powerful Safe Light on Low Voltage with Imperials



Type LAA—Luminous Arc and Incandescent. (Incandescent lamps are used when running through lighted streets of cities or villages.)



Type LAA—Rear door open showing mechanism mounted on air-tight partition.

Even when the voltage is abnormally low Imperial Luminous Arc Headlights project a brilliant penetrating beam. And such a beam is essential to safe operation through the country at night.

Imperials demand little care. They are simple. They are rugged.

The two-compartment case—an exclusive feature—has two functions. The air-tight partiiton—

First, serves to protect the mechanism in the back from the fumes and deposits of the electrodes in the front.

Second, reinforces the already sturdy case.

There are many types of Crouse-Hinds Imperial Luminous Arc, Carbon Arc and Incandescent Headlights. Ask for a demonstration of any of them.

THE OHIO BRASS COMPANY, Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

General Sales Agents in the United States for Crouse-Hinds Imperial Headlights

OB PRODUCTS

Quality First

O-B Type D Splicing Ear—Patented

O-B Trolley Wire Splicers

Strong and Enduring

Where O-B Trolley Splicers go on the line you can be sure of their absolute reliability.

A generous section of O-B Bronze — properly placed for the greatest strength guarantees their dependability.

Saves Wire Wear

There is practically no bend in the wire where it enters the Type C or Type D. Consequently the wire is not weakened where it must stand the heaviest punishment.

The lips fold smoothly around the wire and form such a smooth path for the wheel that arcing is cut to the minimum.

There is an O-B Splicer for each class or condition of service.

Catalog No. 16 *and Supplement No.* 1.

THE OHIO BRASS COMPANY

MANSFIELD, OHIO

New York Philadelphia Pittsburgh Chicago
Los Angeles San Francisco

O-B Type C Splicer—Patented

Phono-Electric

For A New Orleans Belt Avenue

The St. Charles and Tulane Belt—22 miles of single track—is one of New Orleans' longest and busiest lines.

Normal service is 4 to 5 minutes; rush hour service 2 to 1½ minutes.

The first Phono-Electric trolley wire used in New Orleans was installed on this line about nine years ago.

The entire line has consisted of No. 00 Phono-Electric now for seven to eight years, with an average life of four to five years.

Most excellent durability for a No. 00 wire in such service.

2119

Bridgeport Brass Company
Bridgeport Connecticut

Wasted—

35% to 50% of TRACK MATERIAL

INTERNATIONAL

STEEL TWIN TIES

Obviate this wasted material and labor

Of What Engineering Value Is the Concrete or Ballast Between Wooden Ties? Absolutely None. It Represents an Economic Loss of Track Material and Labor.

Steel Twin Ties are designed to overcome just that condition. The effective tie bearing area is placed at the top of the tie and parallel with the rail.

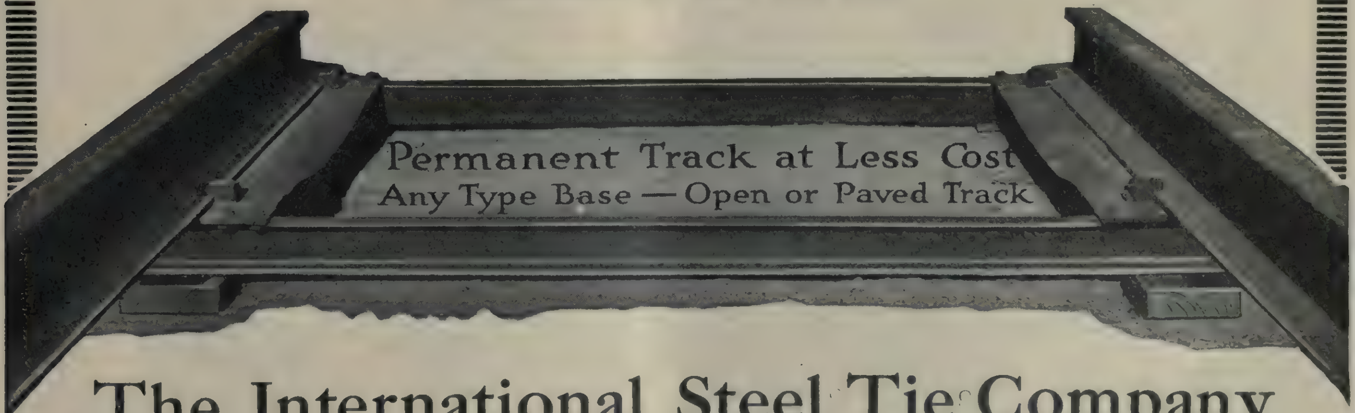
There is an engineering reason for every ounce of metal in a Steel Twin Tie. The 13 in. x 36 in. trussed plates carry the track loads and the 3 in. channels serve as anchorages and tie rods.

Seven inches of concrete beneath the tie plate puts just that much in effective bearing. An inch more than is usually used. And at the same time the excavation and concrete quantities below base of rail are reduced one-half.

Any way you look at them they are engineeringly right. The longer you delay your purchase of some of these ties the more money you waste in extraneous track materials and labor.

Ask our users if you want our best sales argument. If you are convinced ask us for a quotation and delivery.

Prompt deliveries made from stock.


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

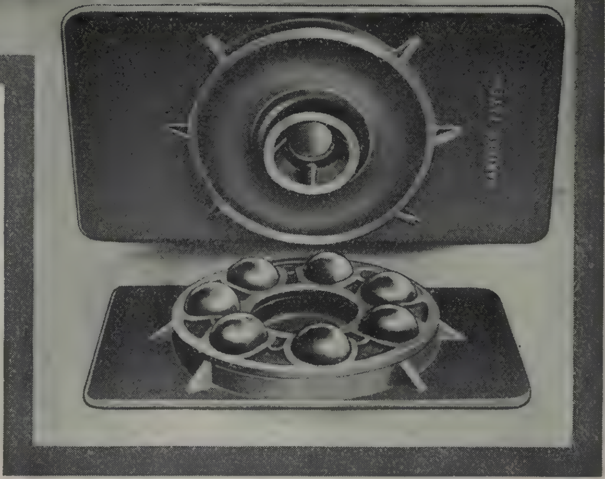
Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

Representatives:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.

Helping to Make Freight Cars Pay



In Heavy Service

Hartman

Center Bearings

Are Saving Flanges, Rails and Current, and Reducing Car Maintenance Costs.

The Buffalo & Lake Erie is one of many companies using these center bearings to increase wheel-life, thus reducing pull-ins for wheel renewals, and helping to keep cars in revenue service.

Hartman bearings are self-centering. They keep trucks rolling straight, decreasing side-sway and nosing, and reducing flange pressure on curves. They double wheel life.

Why continue to use friction center plates when you can get a bearing like the Hartman at no greater cost?

Order a Car Set and Save Flanges

Holden & White Inc.

817 Fisher Building, Chicago, Ill.

National Railway Appliance Co., New York and Washington; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles.

War Workers Put the Finishing Touches on "Golden Glow" Headlights

Several operations in the manufacture of "Golden Glow" Headlights are done by girl war workers. They put in the reflectors, sockets and front lenses with great preciseness. Their feminine touch in this intricate work gives you that added assurance of ruggedness and superiority in "Golden Glow" Headlights.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg

DREW

DESIGN plus QUALITY
is Rewarded

3500 Drew Frogs and Crossings on one order by one Company

What is conceded to be the largest single order for overhead frogs and crossings ever placed by any company was placed in July by the Chicago Surface Lines.

In view of the fact that the order was placed after a service trial covering a period of more than three years, it is significant that the order was given to the Drew Electric & Mfg. Company.

Design and Quality were thereby again rewarded. Shipment was made from stock.

This order is of great significance to other railways, not only because it is the largest ever placed, but also because it is a tribute to material which has stood up for years in the hardest overhead service in the world—the Chicago Loop.

The same design and quality, which were factors in securing this order, is found in all of the overhead line material manufactured by this company. This includes Clinch Ears, Splicers and Splicing Ears, Frogs and Crossings, Section Insulators, Pole Line Hardware, Tools, etc.

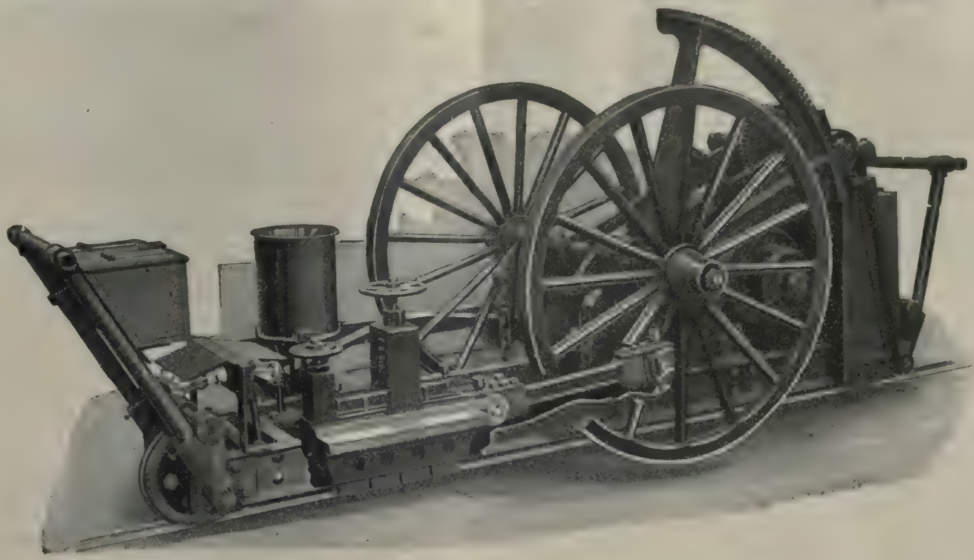
All Drew Specialties, including the Drew Protective and Reclaiming Pole Sleeve, the Drew Motorman's Safety Mirror, the Drew Pipe Insulator, are guaranteed to be free from defects in material and workmanship.

Write for your copy of our 1918 *catalog.*

DREW ELECTRIC & MFG. CO.

Offices and Works:

1016 E. Michigan St., Indianapolis, Ind.



There's a Compound Saving In the Use of RECIPROCATING TRACK GRINDERS

Your investment in them comes back to you—like money in a good savings bank—with compound interest.

In the first place there is the saving achieved by the longer useful life of track.

With cost of track construction in the neighborhood of Forty Thousand Dollars a mile, any means that will add years to the life of that construction means a big saving. And the use of Reciprocating Grinders adds those years of useful life.

In the second place the regular consistent use of Reciprocating Grinders in keeping the bad spots out of rail surfaces definitely reduces the cost of maintenance of the track foundation.

In other words, every cupped joint or corrugation which is not promptly cured breaks up the foundation, throws track out of alignment and compels finally a considerable maintenance expense, which would not be necessary if the bad spot were ground out during its incipient stage.

Thirdly, good smooth track keeps down the damage to rolling stock and definitely reduces the cost of car maintenance. Bad track conditions seriously increase cost of rolling stock repair.

The experience of a hundred roads with the Reciprocating Grinders demonstrates that the regular use of these machines produces these cumulative savings.

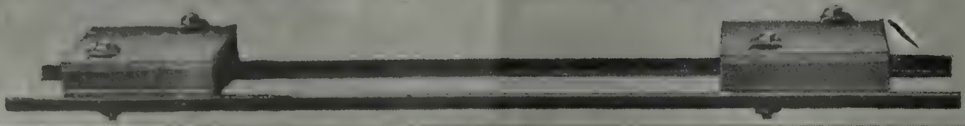
We are ready to prove it on your tracks without expense to you whenever you say the word.

RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago

The MECHANICAL RAILWAY TIE

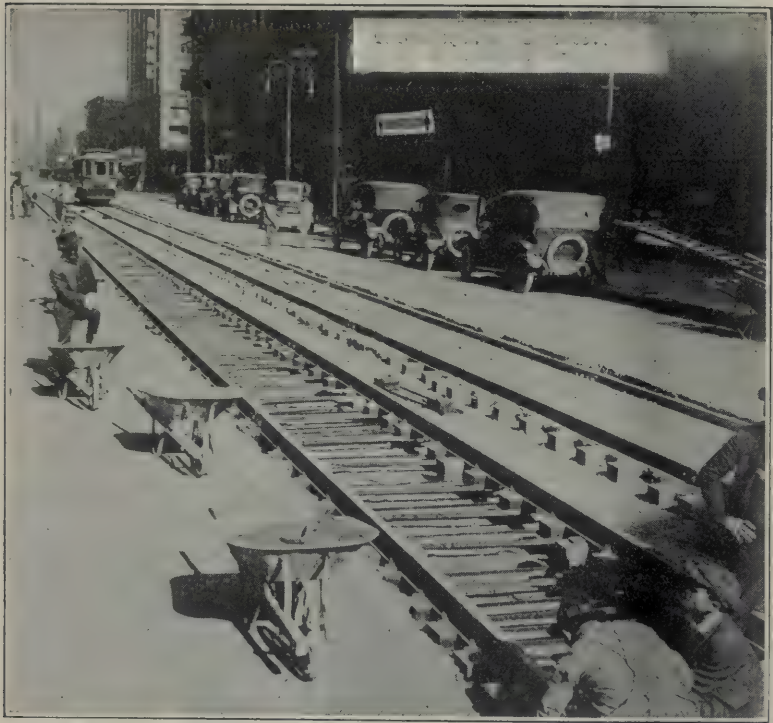


First Cost *and* Final Cost

Wooden ties, without any of the labor cost of laying, are cheaper, piece for piece, than Dayton Mechanical Ties—we freely admit that!

Untreated wooden ties **completely installed** with gravel ballast cost 6% more than Dayton Mechanical Ties for the same length of track.

Wooden ties, **at the end of ten years,** cost more than twice as much as Dayton Mechanical Ties.



Furthermore:

D.M. Ties are permanent.

D.M. Ties outlast the pavement.

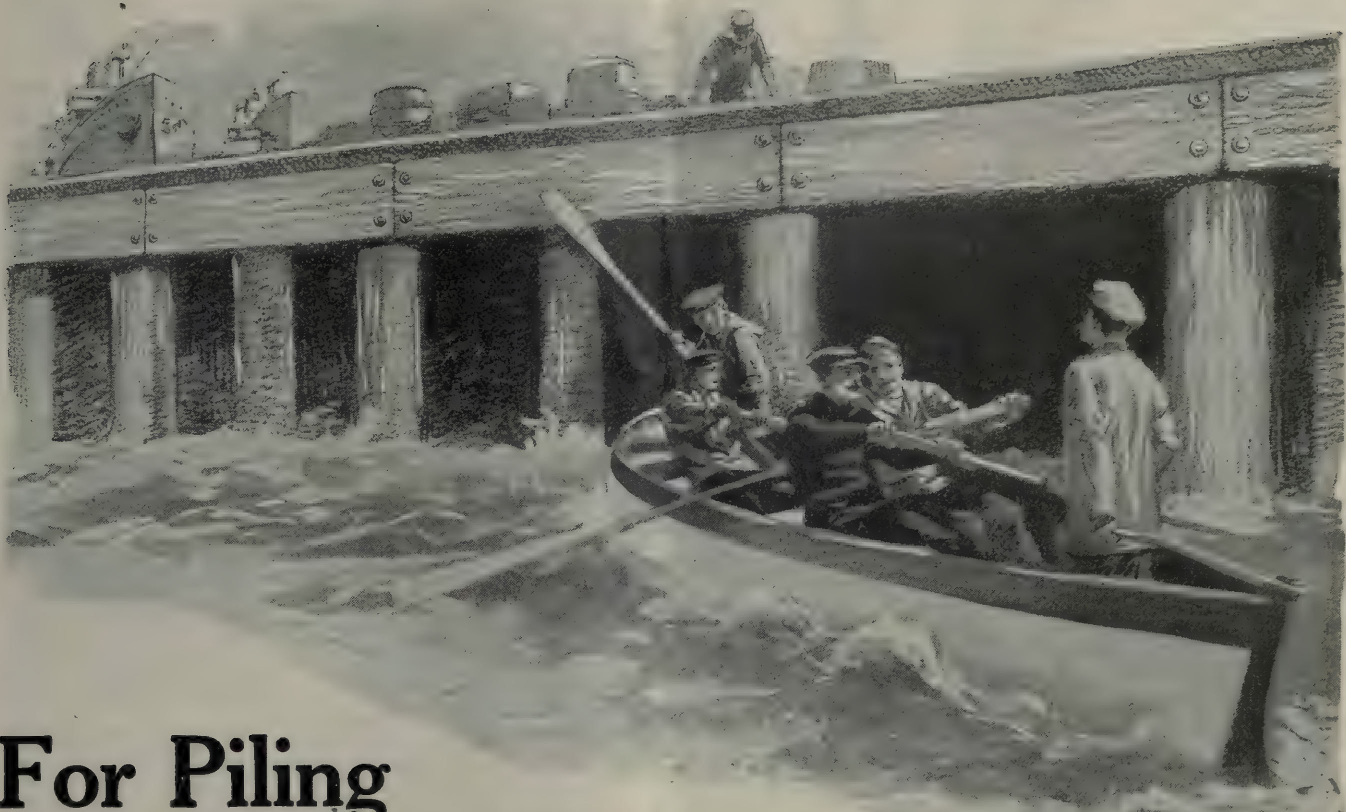
D.M. Ties are cushioned with an asphalt base, under the wooden rail support.

D.M. Ties are attached to the rails as shown in the picture on the left.

D.M. Ties form a rigid, reinforced concrete bed, each tie resting on its own highly resilient cushion.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy. Write today.

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO



For Piling and Wharf Timbers

IT is on water-front work that a wood preservative shows its real value. Here are found the most trying conditions—wet and dry—heat and cold—insect pests and decay germs in countless swarms.

And it is in just such work that the marked superiority of **R.W.P.O.** is best demonstrated. For preserving timbers by dipping or brush treatment it stands without an equal.

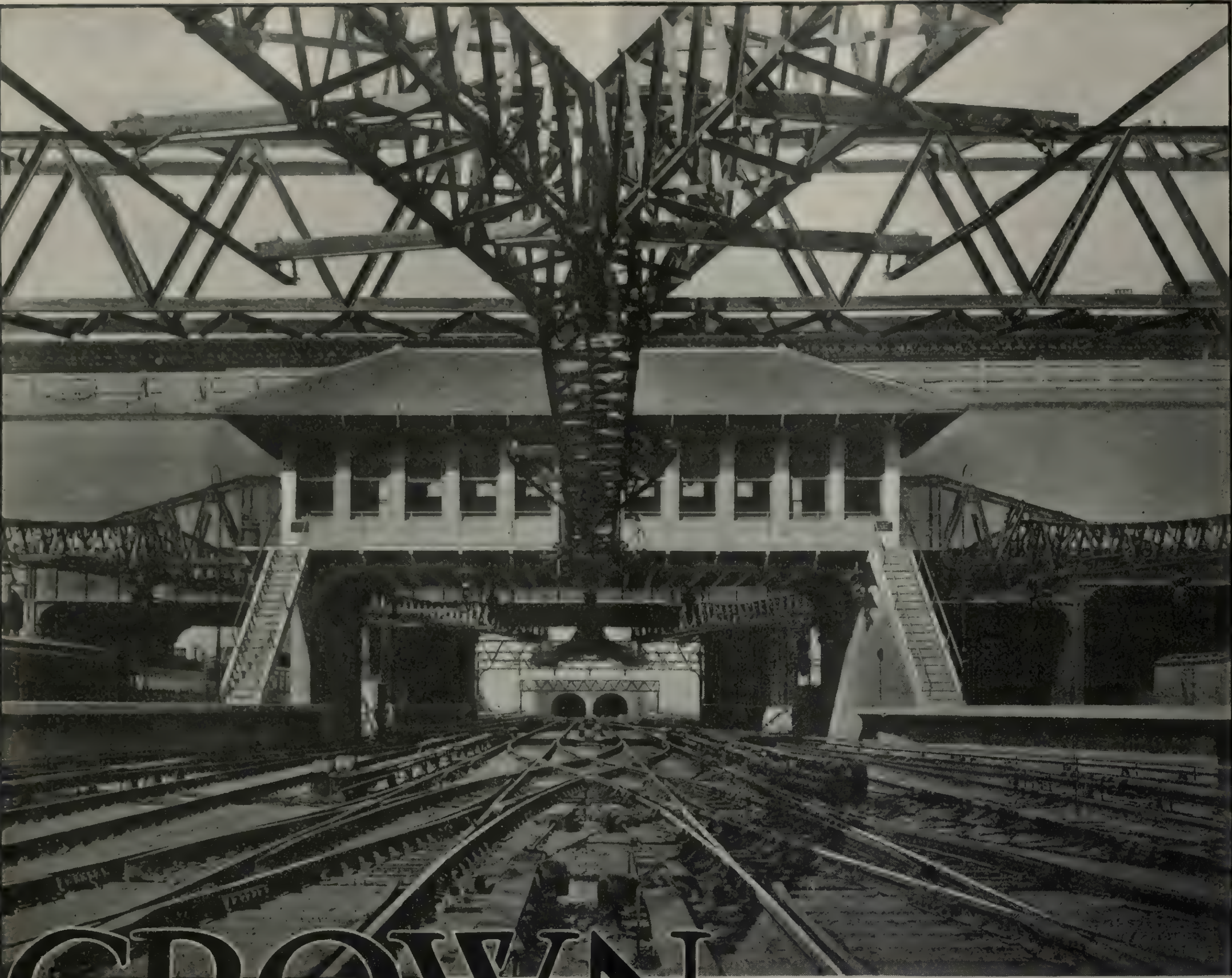
Limpid and free-flowing at working temperatures.

R. W. P. O. cannot leave the wood. It must stay on the job, for it cannot evaporate and it cannot dissolve.

Republic Creosoting Company

INDIANAPOLIS, INDIANA

Plants: **Indianapolis** **Minneapolis** **Mobile** **Seattle** **Norfolk**

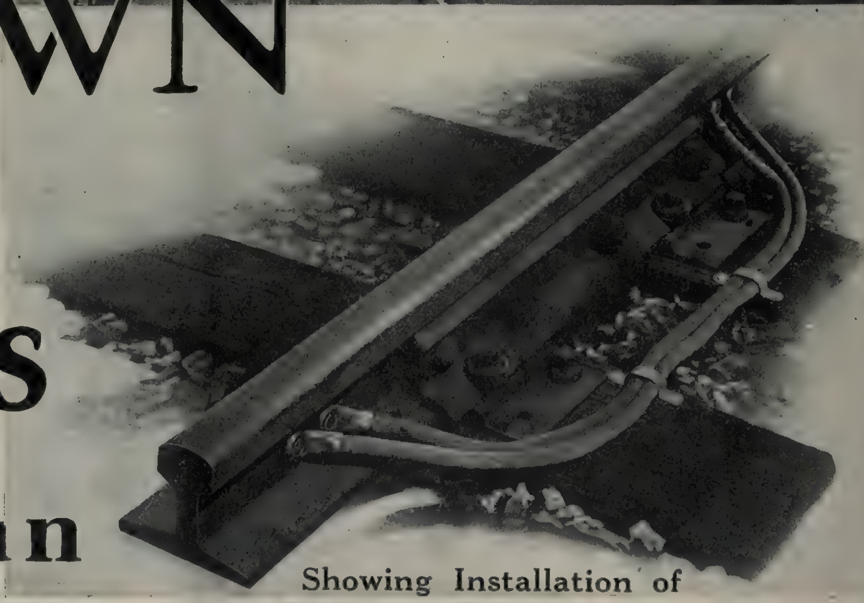


CROWN Rail Bonds

Made by

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh Denver
United States Steel Products Co.
Pacific Coast Department:
San Francisco Los Angeles Portland Seattle
Export Department: 30 Church St., New York



Showing Installation of 400000 cm. Flexible Crown Rail Bonds Applied Around the Joint, on Rails of Pennsylvania Terminal, New York City.

A Nation's Necessity

and the welfare of the Electric Railway Industry now both demand maximum efficiency from every pound of Coal

SHUT OFF THE POWER!" "DON'T FAN THE AIR!"

It behooves you to hooverize your motormen.

It has been definitely proven that the use of automatic devices for recording the consumption of current on cars greatly increase efficiency of operation and greatly decrease the use of power (coal).

It has also been definitely proven that

The Arthur Power-Saving Recorder

is a highly effective and desirable device for this purpose

The Arthur Recorder cannot of itself alone decrease the use of power or increase the general efficiency of car operation—no device can accomplish that. But it is an essential tool for bringing these results about by giving a basis for teaching car operatives to achieve such efficiencies. And the practical results are shown in such experiences as that of the Connecticut Company where power-saving methods based on the Arthur Recorder have shown a steady decrease in current consumption—the saving growing larger each month until in less than a year's operation it has reached the highly satisfactory point of 17% saving of power measured in kilowatt-hours per car mile. This figure being the average attained in the operation of nearly 1200 cars equipped with the Arthur Recorder.

THE ARTHUR POWER-SAVING RECORDER CO.

Second National Bank Building, New Haven, Conn.

A War-time Service Co-operating with Dr. Garfield

WAR-TIME high steam demands have not only definitely established the supremacy of stoker-firing over hand-firing. In addition they have emphasized the necessity for studying individual plant *fuel* and *load* conditions and then choosing a type of stoker to meet those particular conditions.

Fuel demands of essential war industries have dictated changes in fuel distribution which are of wide military advantage to the Nation—many plants formerly operating with high-grade *low*-ash coals now use lower grade *high*-ash coals.

Changed firing methods must necessarily follow.

To the end that the power plant field may adapt itself to this situation without diminishing vital war production, this company offers, gratis, engineering resources and data accumulated during 21 years' experience in the specialized field of combustion—economical burning of lower grade *high-ash* middle west and western fuels.

PATENTED GECO APPLIANCES

Chain Grate Stokers are particularly adaptable to the economical burning of low grade high-ash coals. We will arrange for prompt delivery of Green Chain Grates to plants handling essential work.

Green Engineering Company
East Chicago, Ind.

GREEN
CHAIN GRATES

HOW'S YOUR COAL PILE?

The following is an extract from a notice, dated August 29th, 1918, which was sent to all users of coal on the Eastern lines of the Pennsylvania Railroad:—

> "If and when coal is not unloaded promptly, the names of delinquent consignees will be reported to the Federal Fuel Administration with a view to having the coal transferred to users who will promptly unload.
>
> "Failure to accomplish desired results will make it necessary to place an embargo against such consignees."

Send for Catalog No. 33 on coal and ashes handling equipment at Boiler Houses, or Catalog No. 38, describing the Beaumont Drag Scraper System for the Ground Storage of Coal.

R. H. BEAUMONT CO.

111 S. 5th St., Philadelphia, Pa.

NEW YORK: 50 Church St. **BOSTON: 141 Milk St.**

Coal and Ashes Handling Apparatus,
Peoples Railway Co., Dayton, O.

Beaumont
ONE CONTRACT
ONE RESPONSIBILITY

DELTABESTON

The name "Deltabeston" when applied to insulated wire means a fire-proof wire and one that will give years of hard, satisfactory service

The insulation is pure asbestos fiber with all impurities removed by our special process.

DELTATAPE

Wherever severe conditions are the rule you need "Deltatape."

Fine for insulating controllers, motors, heating devices, etc., where excessive heat is encountered. The base of "Deltatape" is pure asbestos fiber combined with a special compound for impregnation.

D & W FUSES

During times like these people are panicky.

Any sudden noise is likely to cause trouble. This makes "D & W" Fuses especially valuable now, for they open the circuit without the slightest noise or flame. This feature alone, not counting their other superiorities, has caused their adoption by many of the best roads.

Write for details of "D & W" products.

DELTABESTON WIRE REG. U.S. PAT. OFF.

D & W FUSE CO.

PROVIDENCE, R. I.

D&W REG. U. S. PAT. OFF.

One Man for Two

with National Pneumatic Door Engines at Austin, Texas

The first three of these seven safety cars when delivered had manually operated doors and were operated by *two* men.

To-day they have National Pneumatic Door Engines (as part of the Safety Car Devices Company's Control Equipment) and are operated by *one* man.

Not on the same schedule but a faster one!

A tip to a live one is enough!

NATIONAL PNEUMATIC COMPANY INC.

50 Church St. New York

515 Laflin St. Chicago

Power Leaks Eat Into Profits

You are pouring out your profits in a golden stream if you are disregarding the proper insulation of your field and armature coils, motors, cable leads, etc.

Lighten your power load and increase your earnings by stopping these leaks with

Irvington Black Varnished Cambric

Time Proves Its Superiority

Black and Yellow Varnished Cambric
Black and Yellow Bias Cambric Tape
Oiled Silks Oiled Papers
Black and Yellow Insulating Varnishes
Black and Yellow Flexible Varnished Tubing

IRVINGTON VARNISH & INSULATOR CO.

Irvington, New Je

Through 24-inch Snow Bank Like a Hot Knife Through Butter

Remmele Broom

"MAKES THE SWEEPER"

If you saw a Remmele Broom "in action" last winter you *saw something worth remembering!*

You saw a broom that cut through 24-inch snow banks without any perceptible effort and left *clean tracks* and *clean* pavements behind it—

besides covering three times more ground into the bargain!

And you're going to see Remmele Brooms on many of the most progressive electric railway lines all over the country *this coming winter.*

Street Railway Executives and Road Managers won't forget in a hurry the lesson of last winter. They won't forget how the snow drifts foiled the ordinary type of brooms, stalled the cars, disarranged schedules, lost fares, sent overhead expenses soaring and made thousands late for work. And late workers now mean that vital *Government work* is held up and handicapped.

Last winter the Remmele Broom triumphed over every condition that put the ordinary sweeper broom out of business.

The Remmele Broom "stood the gaff," the strain and the pound of high speed 400 revolution-per-minute operation.

The Remmele Broom not only outlived a dozen ordinary types, but cut the *cost of feed* 50%. The reeds last twice as long. They don't break off. They stay effective. And when they *must* be replaced you can refill an entire broom *in less than* 60 *minutes* by a filling device we are putting on the market. Compare this with the 6 to 10 *hours* required by other types.

A glance at the way the reeds are put in explains this super-efficiency. The construction is strong and simple, and does not take away from the resiliency and toughness of the reeds so necessary to efficient work.

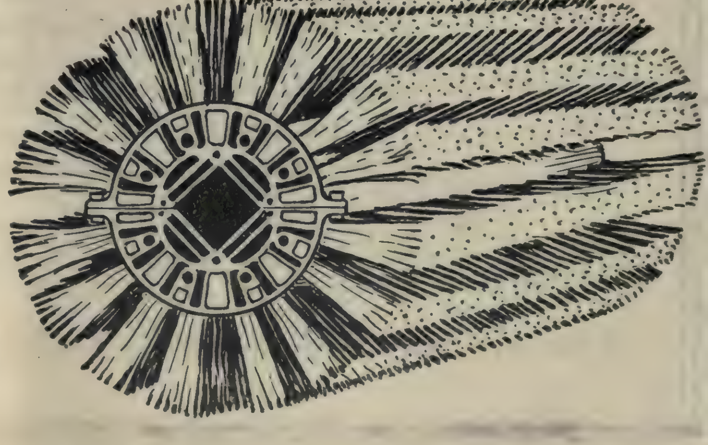
The Remmele Broom cuts *down the force of men you* ordinarily need for snow cleaning—

Cuts down the time ordinarily needed to clear your tracks.

Cuts down delays in schedules and, finally cuts the cost of broom up-keep to the lowest possible figure.

You can use Remmele Brooms on your old equipment without changes.

Every Reed
Over 100%
Service



REMMELE & MAIER

370-372 So. Seventh St., Newark, N. J.

The future of the Electric Railway Industry

may depend on the result of the IMPORTANT MEETING of electric railway executives to be held in New York on

November 1st

This meeting takes the place of the annual convention of the American Electric Railway Association. Revolutionary changes may be crystallized by this meeting. Among the subjects which will be fully discussed and acted upon are such as government aid in assuring stability of electric railway investments, flat fare increases and the coming of zone fares, how auto competition is being met, etc.

Naturally, every executive in the electric railway field eagerly awaits the first complete news of the meeting.

Naturally, also, he will expect this report in his **Electric Railway Journal.**

To meet this need, the Journal will perform a journalistic feat and publish the news in a

Report Issue Dated November 2*nd*

Practically every road in the United States and Canada will be covered by the circulation of this issue. It provides, therefore, AN EXCELLENT OPPORTUNITY FOR ADVERTISERS to tell their story of helpfulness to a field eager to adopt any approved means for instituting more efficient and economical methods in the power plant or substations, on the line or on the cars.

Tell your story in a big way if your products can be used to advantage. **Printing begins October 28th.**

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SKIP STOPS mean faster service at less cost for fuel and labor. If the running time, with skip stops, is shortened, the average car energy consumption may or may not thereby be reduced — BUT either *Car-Hours, or Kilowatt-Hours, or both will surely be saved!*

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The Economy Meter is the *only* power saving device whose direct readings tell whether power is being saved under varying operating conditions.

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Whenever the principle of the Miller Trolley Shoe has been correctly applied and fairly followed up, the user reports a life far in excess of the trolley wheel and a wire-wear that is less than it would be with a higher tension contact that does not hug the trolley wire as tenaciously as the Miller Trolley Shoe.

The Miller Trolley Shoe is adapted to all classes of service—from the smallest one-man car to the largest electric locomotive. Just order enough to equip your *hardest* line!

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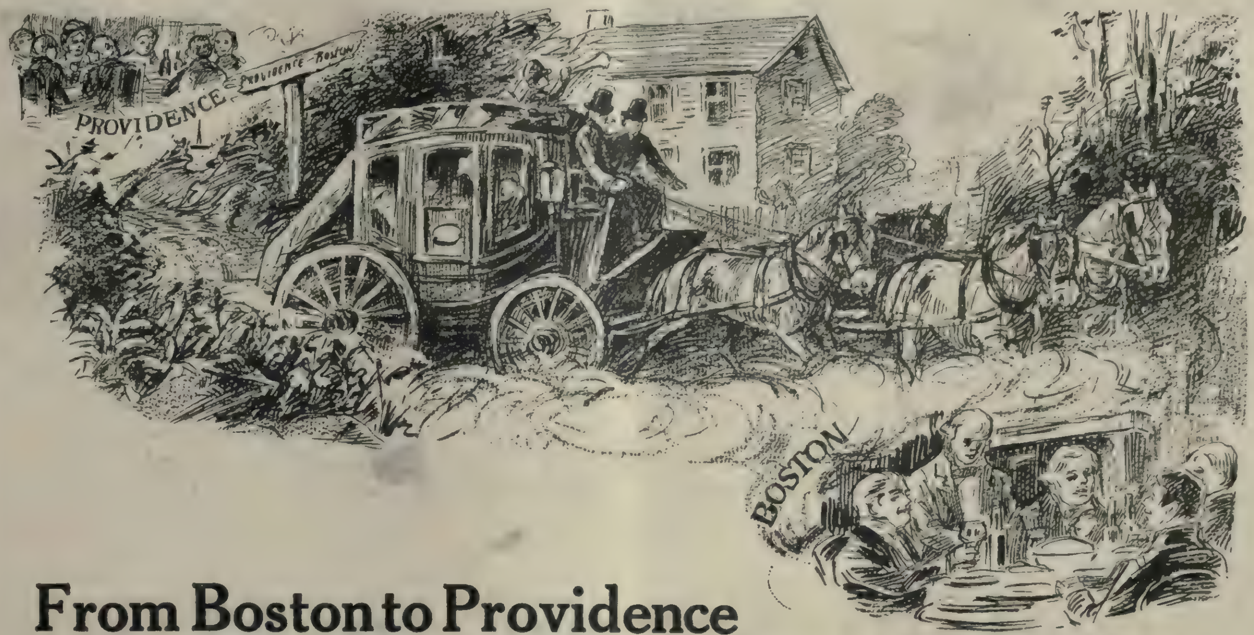

From Boston to Providence There Ran Two Competitive Stage Lines

—in 1820! One was new and anxious to secure a hold on the trade, while the other had been in business for years and had waxed fat on the business of carrying the young bloods to and fro between the cities.

The fare from Boston to Providence was $2.50 each way—which made a handsome profit. The new line cut the price to two dollars. This angered the older company and they in turn cut their price to one dollar—whereupon the new company held the price at one dollar but "threw in" a dinner—at either end of the trip.

Then the thing settled down to a "stick it out" fight. The older stage line offered to carry the people between Boston and Providence *for nothing.* The new line carried them for nothing and threw in the dinner besides. Then the richer older company finished the argument by carrying the people free—giving them dinner free—and throwing in a bottle of wine!

A dancing master of Boston, a genial gentleman about town, seeing the humor of the situation and an opportunity for free entertainment, gathered together several of the young bloods of Boston and, every night for a week, sat down to dinner and a bottle of wine in Providence. Came back the next night to dinner and a bottle of wine in Boston! At the stage's expense! At the end of the week both companies saw the fallacy of cut-throat competition and set the contract price at two dollars for both lines.

Galena Oils

have special features that render competition almost impossible. The lead emulsified into the oil—makes a superior lubricant—and Galena Service makes it more economical.

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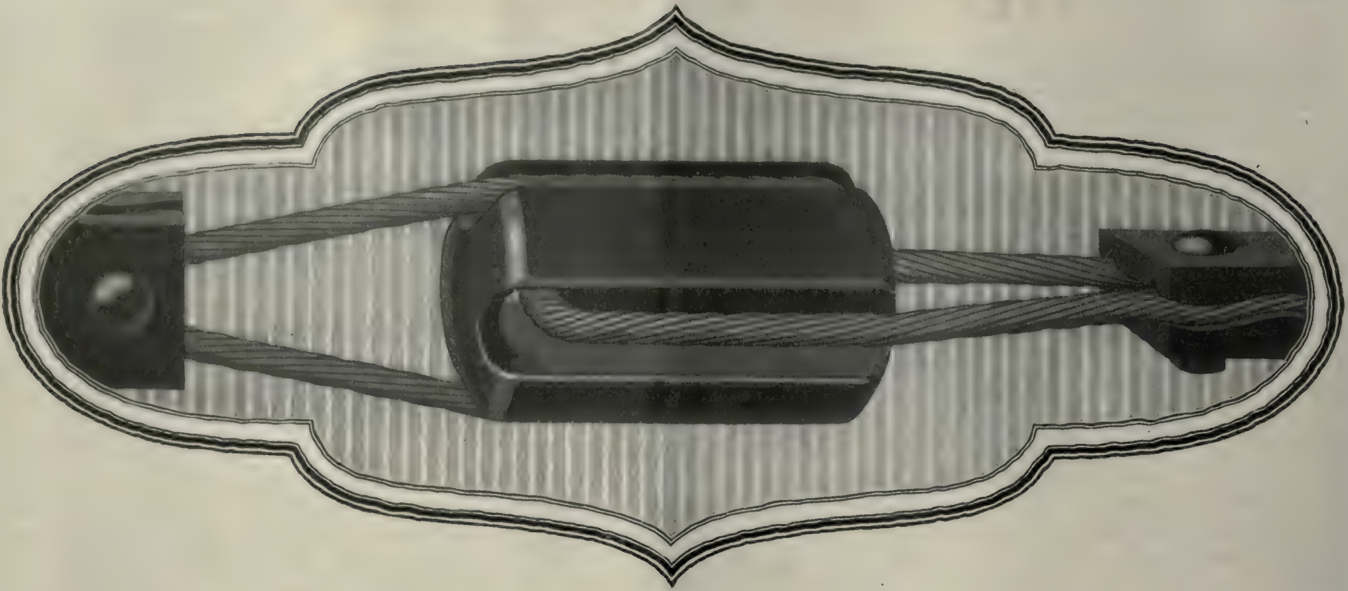

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It pays to buy the best

The outward appearance of a porcelain insulator gives little indication of the care and materials used in its making. Only actual service over a period of time will separate the well-made from inferior insulators.

G-E porcelain insulators are built up from the beginning under the close scrutiny of men long experienced in the art. Especially is extreme care exercised during the vital processes of moulding, drying and firing.

Insulators made in this manner cost more, but because they give real service and longer life they are worth more.

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GENERAL ELECTRIC COMPANY

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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, October 19, 1918 *Number 16*

He Is from Missouri and Wants to Be Shown

THE favorite slogan of Missourians is supposed to be "Show me." There is a Kansas City in Missouri and another city of the same name across the Kaw River in Kansas. The Kansas City Railways Company operates street cars in both localities. On the Missouri side the company has been permitted to charge a 6-cent fare, but no such relief has been given on the other side of the river. As a result the employees in Missouri have been getting higher wages than their fellows on the Kansas lines. Recently the company undertook to suspend service on one of the Kansas lines in order to make up a deficit. The Kansas Public Utilities Commission promptly directed that the service be restored. President Kealy—as announced in the Oct. 5 issue of the ELECTRIC RAILWAY JOURNAL—has sent a letter to the Mayor of Kansas City, Kan., in which he offers to surrender to that city complete control of the local electric railway system in return for a guarantee of 6 per cent interest on the capital invested. He also agrees to help the city authorities remove any legal barrier which may be found to stand in the way of taking over the lines. Can the Kansas authorities ask for a more open-handed offer? What an opportunity is here offered to take over a going concern on a fair basis and furnish service at cost! Surely the rate of return mentioned by President Kealy is not excessive. The Kansas Mayor has a splendid chance to show what kind of service can be given for 5 cents. If his people are behind him they should grasp at this offer and undertake to prove that electric railway managers do not know what they are talking about. Perhaps they can retain enough surplus out of the nickel fare after paying all expenses to reduce the municipal debt. Truly this is too good an opportunity to be passed up.

Colonel Kealy standing on the Missouri side of the Kaw might well say "Show me." Crossing over the river he bids the people to "Let George do it."

AMERICAN ELECTRIC RAILWAY ASSOCIATION

N. Y. Conference Program

Meeting to be convened at
UNITED ENGINEERING SOCIETIES' BLDG.
29 West Thirty-ninth Street
at 9.30 a.m.

Friday, November 1

MORNING SESSION—
Address by President John J. Stanley
Report of Electric Railway War Board
Topical Discussion:
The Needs of the Interurban Electric Railway

AFTERNOON SESSION—
Topical Discussion:
As Follows: — Light - Weight Cars, Zone System, Higher Unit Fare, Public Subsidies, Public Ownership

The discussion on each topic will be introduced by the presentation of a ten-minute paper prepared by a man of wide reputation in the electric railway field.

Why Should Wages Be the Same Where Conditions Are Different?

PRESIDENT KEALY and his associates in the management of the Kansas City Railways Company are to be commended also for making a strong defense in their case before the National War Labor Board. Ever since the first batch of awards was made by this body fixing wage scales beyond the financial ability of many of the employing companies, there has been a general feeling of despair in the industry. This was aggravated when the higher authorities announced that nothing would be done by the federal government in the way of providing means to meet these new burdens of expense. Some relief has been given here and there by local authorities to take care of individual cases, but there are still numerous companies facing the conditions brought about by the Labor Board's decision which have not been given a helping hand. Far from despairing at the outcome of the first cases handled by this board, President Kealy has set about to prove that the practically uniform wage rate announced for other cities would not be fair in the Kansas City case. First, he went before the board with an agreement signed by the management and the organized employees providing that any advance in the wage rate should be limited by the financial ability of the company to pay. Evidence has been presented since that time to prove that the company would be in a distressing financial condition if any substantial wage increase were given to the employees.

It has been argued in the Kansas City case that general figures on increased cost of living do not show the facts as far as this situation is concerned. Careful studies were made as to costs of food, rentals, etc., in Kansas City. Accurate information was presented on actual living conditions among the employees. An interesting point brought to light is the fact that the average family of the company employee consists of 3.4 persons. Cost of living has usually been figured on the basis of five persons to a family. While this particular showing may have little weight with the Labor Board, it emphasizes the fact that generally accepted bases sometimes are unfair in specific cases.

Significant Program Will Confront New York Conference

THE conference of electric railway men which is to take the place of the annual convention of the American Electric Railway Association will find itself face to face with momentous problems—problems more momentous than have ever before been confronted in this industry. The meeting should bring together the best leadership in the electric railway field. The circumstances are such that very definite progress should result. The five topics listed for the afternoon session indicate the high spots in electric railway management at the moment. They range from physical equipment to broad economic principles. These topics have been carefully selected in the expectation that their discussion will lead to some formulation of the procedure which must be followed if electric railways are to survive and serve. The general public as well as the personnel of the industry will be vitally interested in the outcome of the conference.

Tuning Up the Snow-Fighting Equipment

AMATEUR weather prophets are predicting a mild winter, a condition which will be greatly appreciated by transportation and way departments if it materializes. Squirrels are said to be laying up a lighter supply of nuts than usual, and farmers are reported to have found the corn husks quite thin this fall. Reliable as these omens may be for the farmer, they cannot be depended upon for the electric railway operator; hence, the very considerable activity in getting snow-fighting paraphernalia into shape which is manifest in railway shops everywhere. In comments upon the subject of preparedness in this matter, in the issue of this paper for Aug. 31, four requisites of a successful snow-fighting campaign were listed; namely, equipment, organization, *esprit de corps* and alertness. Equipment is placed first because the best of organizations is badly handicapped unless the proper tools have been provided. The problem in preparing the equipment is to anticipate local conditions on the basis of past experience so that all reasonable demands can be met. In addition to the standard plows and sweepers, excellent progress has been made in some quarters in fitting up work cars and other cars with light plows and scrapers. A number of such have been described in recent issues of this paper.

From the master mechanic's standpoint the special demands in the way of emergency equipment afford the most interesting problems. An example is the ice-cutting device constructed from a plow and from sweeper fittings, made and used at Schenectady and described elsewhere in this issue. A still more simple but very effective ice cutter was rigged up overnight at Rochester last winter. It consists of a knife slightly longer than the track gage, mounted on a stout angle iron attached rigidly to the truck frame of a single-track car in such a position as to clear the rail tops by 2 in. or so. When this car is weighted down and is propelled, with the assistance of a four-motor car, over ice-clogged track, the ice is sheared off clearly and effectively. Undoubtedly many such plans have been tried out successfully. This paper will be pleased to print accounts of any practicable scheme, knowledge of which will contribute to snow-fighting preparedness.

The wisdom of investing a few thousands of dollars in providing and preparing equipment for snow fighting by way of insurance is obvious when one considers how unnecessarily expensive, in dollars and public irritation, may be a few hours of preventable tie-up. It ought to be easy to get the general manager's "O. K." on a requisition for this purpose by reminding him of what happened last winter.

The "Good" Is Often The Enemy of the "Best"

THERE is many a slip 'twixt cup and lip. When the Mayor of St. Louis last April signed the United Railways resettlement ordinance, which had been approved by the Municipal Assembly by a vote of twenty-eight to one, and when President McCulloch characterized the proposed ordinance as a not ideal but "fairly good solution of a difficult problem" and expressed the hope that it would be accepted as a compromise by both parties, the way for final adoption seemed clear. But now, as noted elsewhere this week, Mr. McCulloch, well within the year allowed for acceptance, has rejected the ordinance. Why? Conditions have changed materially in the last few months, and it is now evident that the company's financial structure cannot be permanently adjusted under the proposed plan. But other objections strike directly at some of its fundamental principles.

In the first place, Mr. McCulloch declares that the ordinance is defective in the light of present standards because it does not make it easy or convenient for the public to assume operation or ownership of the property. The plan was to give the city the right, after the expiration of ten years or any five-year period thereafter, to purchase the property. This is not an unheard of provision; wherein should it cause dissatisfaction? The answer is found in Mr. McCulloch's clearly expressed distrust of commission regulation as a successful means of assuring proper service to the public and a fair return to investors in a period of crisis. Regulation has failed, he seems to feel, and the city should not be estopped by a formal, widely spaced schedule from trying to secure relief in its own way if the public should happen so to desire.

But—and this is the second point—if the public wishes to have service-at-cost operation under private ownership, then the plan should provide for good service at a minimum cost. With regulation as a system under suspicion, however, no faith is maintained that such a result can be obtained with the proposed 5-cent fare, changeable if and when the local commission has jurisdiction. In Mr. McCulloch's opinion, it can be secured only through a public "guarantee" of operating expenses, taxes, provision for future replacements and a fair return. Does this refer to a legal guarantee that the community's taxing power will be exercised to make up deficits in annual net income, as in the case in Boston until the revenues have made up the deficiency, or does it refer simply to the practical guarantee afforded by a flexible fare capable of prompt and automatic adjustment? The latter appears to be the case, because of possible constitutional restrictions on the former and because, in speaking of the proposed ordinance when it was passed, Mr. McCulloch deprecated its lack of a leading feature of an "ideal" ordinance—"a flexible fare which may be adjusted automatically from time to time so as to guarantee always good service, fair wages and a sure return upon the investment."

In short, the St. Louis resettlement plan is deficient in the very fundamentals in which it should be the strongest; it lacks a maximum of flexibility to provide what the company needs in the way of revenue or what the public wills in the way of control. In rejecting the ordinance the company is not fighting against the city's interests; it is simply asking the city to give full expression to modern far-sighted principles in laying a basis for dealing with future citizens, car riders and investors. In view of the long franchise negotiations in St. Louis, a compromise measure may a few months ago have seemed wise, but the company is right in now declaring that the ends to be gained are worthy of further effort.

The Evolution of the Track Switch

AN AUTOMATIC track switch is one of the easiest things in the world to design on paper and one of the most difficult to bring to a commercially successful status. The urgent necessity for something of the sort, however, has furnished an active stimulus to inventor and manufacturer, so that now several good devices are available. The present and prospective labor shortage, together with the need for all practicable devices which will assist in increasing the schedule speed of cars makes the track switch particularly interesting at this time. For this reason we arranged with R. C. Cram, of the Brooklyn Rapid Transit Company, to make a comprehensive survey of the subject, and the results of his study are given in an article in the present issue. To provide space for this and on account of general space limitations the publication of the next articles in the series on power transmission and choice of car equipment respectively will be deferred until November.

To return to the problem of designing a track switch that will operate in a reliable manner let us first attempt to realize what the designer is up against. His chief enemy is the weather, which has the ability to impose mechanical and electrical obstacles in his way. Devices which would be entirely reliable on a car or in a substation cannot be depended upon out of doors. The electric solenoid and plunger or the electric motor can supply all of the mechanical force needed for pushing over a switch tongue provided that current supply is available and ample and that no serious obstructions interfere with the motion of the tongue. But there's the rub, how shall good electric circuit continuity combined with freedom of tongue movement be obtained? How the difficulties have been overcome and the modern track switch evolved is taken up in Mr. Cram's article.

Another feature of switch operation is, of course, that of positive locking. To obtain this is not difficult if the other requirements are met.

Are Unreasonably Low Fares Confiscatory?

ARE the federal courts destined to be the final resort for fare relief? A brief news item in our issue of Sept. 28 told of a decision of Judge English in the Federal Court granting a permanent injunction restraining the Illinois authorities from interfering with the Illinois Traction System in the proposed increased passenger rates above 2 cents a mile with 3 cents as the maximum that can be charged. On page 676 of the issue for last week it was announced that another federal judge has taken up the application of the Grand Rapids, Grand Haven & Muskegon Railway designed to prevent enforcement of the Michigan 2-cent fare law.

The Illinois situation is especially interesting because of the tangle in the rate situation brought about by the court's ruling. An Illinois statute has for several years fixed a limit of 2 cents per mile on passenger hauls. The Public Utilities Commission of the State has frequently held that it is powerless to allow charges above that maximum. Before the federal government took over the operation of steam roads the courts had also refused to grant a higher rate to such carriers in Illinois. With the inauguration of federal rule, the passenger rate for the steam roads was fixed at 3 cents per mile.

This, however, did not apply to electric lines within the State. The decision of Judge English apparently paves the way for other electric roads to secure a 3-cent rate within the State. However, in the case of the Illinois Traction System which operates across the river into Missouri the company encounters the ruling of the Interstate Commerce Commission that not more than 2½ cents per mile shall be charged. This tangle is further complicated in the case of the Alton, Granite & St. Louis Traction Company where the State limit of 2 cents per mile still applies and the I. C. C. maximum is met at the State line. This company has an appeal for a 3-cent rate pending in one of the State courts.

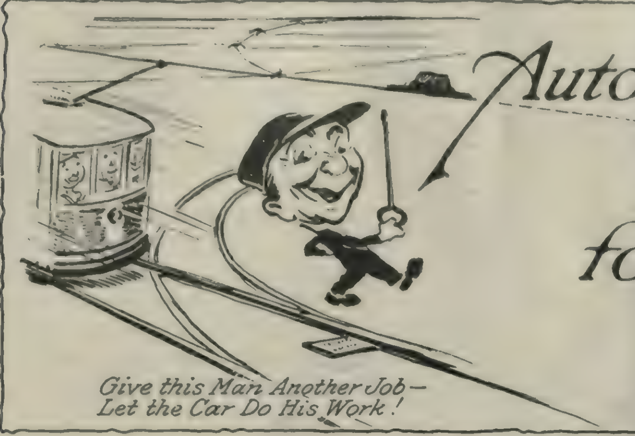
Here we find the Illinois Traction System with federal court authority to charge as high as 3 cents per mile within the State. To put that rate into effect in conjunction with the 2½-cent tariff for interstate hauls might be attacked as discriminatory. Apparently the only way in which full benefit can be had from Judge English's ruling is for the Interstate Commerce Commission to allow a similar rate for trips across the river into Missouri.

It is to be hoped that the Interstate Commerce Commission will have the broad vision of Judge English, who held that "complainants herein are subject to the same operating conditions and expenses as exist on steam lines of railroads now under federal control and that the service performed by the complainants compares favorably and is in competition with such railroads under federal control."

If State commissions or State courts are powerless or unwilling to untangle such situations as the above, we must look to the federal tribunals to clear up such palpable cases of confiscatory laws. Perhaps this latest form of remedy for inadequate rates is the solution for the troubles of the electric railways. Some drastic remedy seems necessary.

Automatic Track Switches Release Men for Other Work

By
R. C. Cram
ASSISTANT ENGINEER, DEPARTMENT OF WAY AND STRUCTURE
BROOKLYN RAPID TRANSIT SYSTEM


Give this Man Another Job—
Let the Car Do His Work!

A Study of the Development and Present Status of Automatic and Remote-Control Track Switches, with Consideration of the Factors Which Have Contributed to Their Evolution

THE traffic requirements of street railway car operation upon lines having very close headways necessitate the employment of some means for turning the switches in order to minimize delays at junction points. With car schedules under which the cars do not reach a closer spacing interval than three minutes it is possible for the motorman to turn the switch by hand with his switch iron, without causing undue delays to following cars, but where the interval is less than three minutes it becomes necessary to employ a switchman. But the cost for this amounts to $1,000 or more per year for each switch, and it was the desire to cut down this operating expense which led to the employment of mechanical and electrical devices as substitutes. The introduction of various forms of prepayment and center-entrance cars, which impose door-opening and closing duties upon the motorman and render his constant presence upon the car desirable, is another factor which in recent years has contributed to the quite general adoption of switching devices.

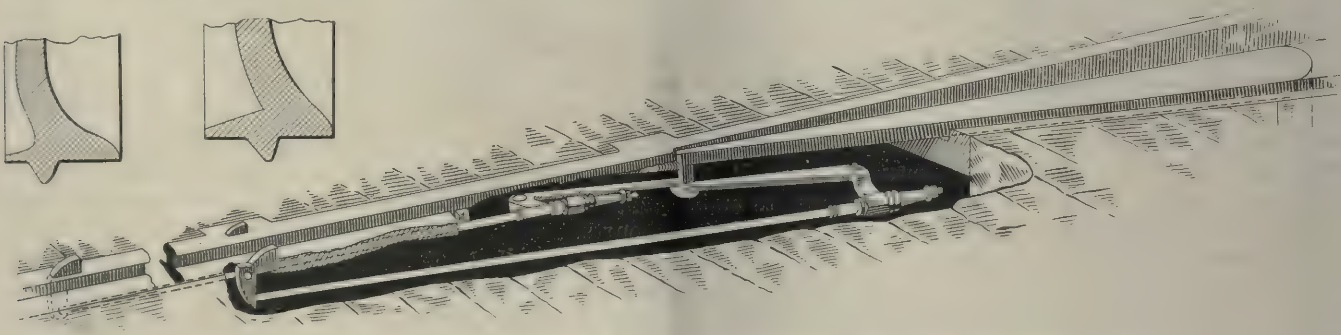


FIG. 1—EARLY MECHANICAL FORM OF TRACK SWITCH USED IN NEW YORK CITY

There is no question as to the fact that the installation of electric track switching mechanisms will result in an operating economy at any location where traffic conditions warrant the employment of a switchman only in the rush hours, say for a total period of six hours per day. This saving effected is indicated in the accompanying Table I.

The operating costs used in the table are believed to be very conservative. A recent questionnaire in *Aera* developed a range in maintenance costs for electric switching devices of from $35 to $100 per year, with an average of the four costs reported, of $65 per year per switch. It is believed that $100 will closely approximate the maintenance cost, exclusive of interest for these mechanisms on any road where there is a traffic which requires an average of not less than 500 movements per switch per day. It is to be noted that the electric apparatus is available for operation all of the time, while the use of switchmen is mainly confined to from six to eighteen hours per day.

The first attempts to produce such devices were solely along mechanical lines and the Patent Office undoubtedly has many recorded patents for mechanical devices in its files. Nevertheless a purely mechanical device has never met with favor nor has one ever been produced which has met with sufficient success to warrant its general adoption in electric railway service. According to information from Fred Bland of Sheffield, England, this statement covers the British situation also.

The first automatic track switches were used on horse car lines and consisted of two platforms resting on opposite ends of a pivot lever, somewhat like a see-saw. One platform was at the right hand side of the switch point while the other was at the left. If the switch was

TABLE I—COMPARISON OF COSTS FOR ELECTRICAL AND MANUAL OPERATION OF TRACK SWITCHES

Type of Operation		Hourly Cost	Annual Cost	Annual Saving
Manual Operation, $3.50 per day of twenty hours	....	$0.160	$1,277.50	....
Electrical Operation:				
Device cost, installed	$285.00			
Interest at 5%	14.25			
Annual maintenance expense	100.00	.013	114.25	$1,163.25

to be thrown to the right the horses were pulled over so that they walked on the right hand platform which depressed under their weight, throwing the switch to the right. A heavy ball weight rolled over at the same time, holding the switch in place. If the movement was to be to the left, the horses were pulled onto the left hand platform with the similar results. The chief difficulty with this device was due to freezing and clogging with mud.

Another one of these early mechanical devices is shown in Fig. 1. It was produced in 1892 by C. E. Carey, then master mechanic of the Dry Dock, East Broadway & Battery Railroad Company, now a subsidiary of the Third Avenue Railway, New York City. As will be seen, it depends upon the use of a projecting lug which would be engaged by the wheels of certain cars only, the latter being equipped with wheels having a wider tread or special flanges.

With the advent of electric cars a mechanical device was designed to be put in the ground, using a cam shaped surface to be engaged by a pedal attached to the car platforms and depressed by the motormen. It was not successful because the mechanical part in the ground would freeze and get clogged, while the mechanism on the cars became broken by contact at too great speed with street obstructions. The requirement of parts to be attached to the car was also a disadvantage.

The early electrical devices attempted to follow steam road practice and the operating magnets were placed on the trolley pole at the curb, with connections by means of rods or wires to the switch point. Undoubtedly the placing of the magnets on the poles was for protection against moisture. One of the first electric mechanisms of this kind was the Porter device installed in Detroit, Mich,, about 1895 or 1896. Another one of similar design was installed in Brooklyn about 1900 by Spangler. The chief trouble with these designs was due to the fact that the ordinary stuffing box did not keep the water out and the mechanical parts would freeze up.

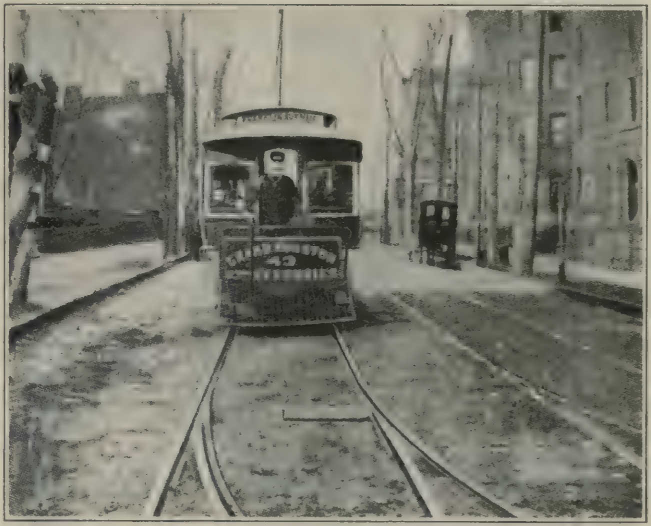
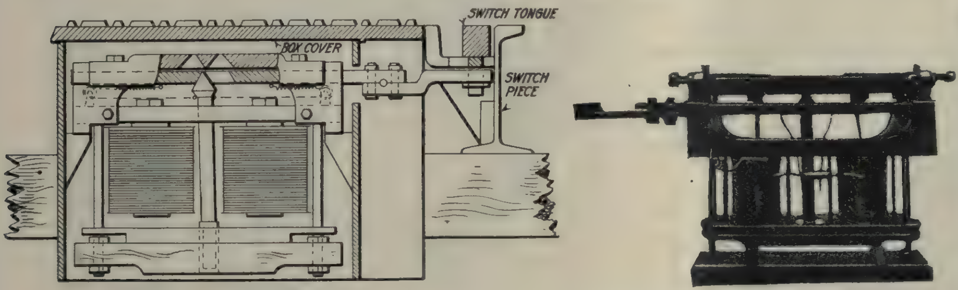


FIG. 2—STREET VIEW OF AN EARLY TYPE OF AUTOMATIC SWITCH

Meanwhile Squires, Cheatham and Baldwin were developing their devices. There is a record of two installations of the Baldwin switch in Brooklyn in March, 1897. They were put on the market by the New York Switch & Crossing Company. It is of interest to note that they were still in service until 1913 when they were removed for replacement with a more modern type. Some details of this device are shown in Figs. 2, 3 and 4 and a wiring diagram is shown in Fig. 6. Squires had his device in service in Springfield, Mass., and Cheatham installed his first device in operation in Louisville, Ky., about the year 1899.

These types placed the magnets in a mechanism box in the ground at the switch point, thus simplifying the device and the Baldwin type provided for drainage connection to the sewer, in order to protect the magnets. Cheatham's device placed a water-tight case around the magnets for protection and the Squires device was also designed to be water tight.



Section A-B (*See Fig.* 6)

FIG. 3.—SECTION AND VIEW OF A PIONEER ELECTRIC TRACK SWITCH

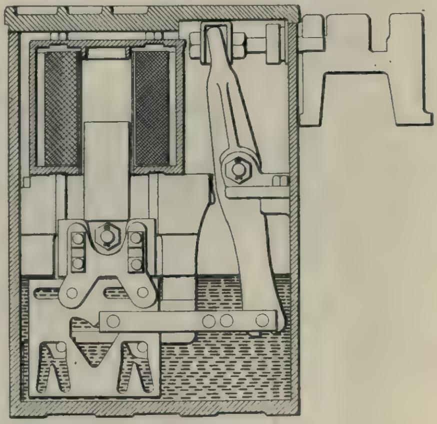


FIG. 5—SWITCH BOX WITH REVERSING CAM PLATE

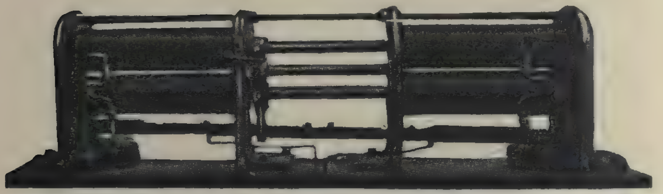


FIG. 4—EARLY DEVICE FOR USE IN CONDUIT TRACK OF METROPOLITAN STREET RAILWAY, NEW YORK

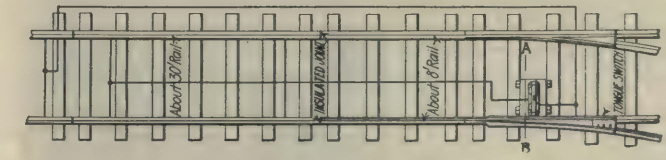


FIG. 6—WIRING DIAGRAM FOR AN EARLY TYPE OF ELECTRIC SWITCH

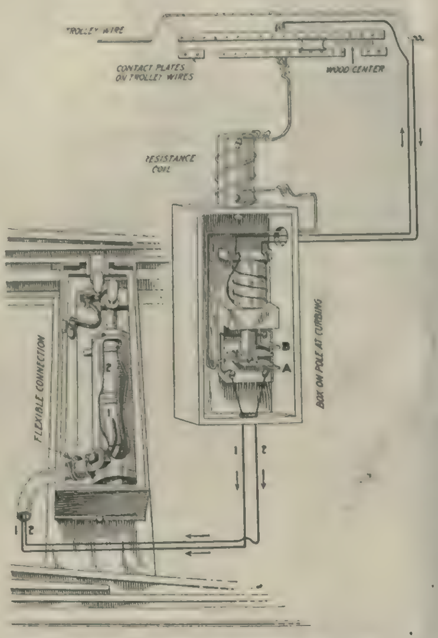
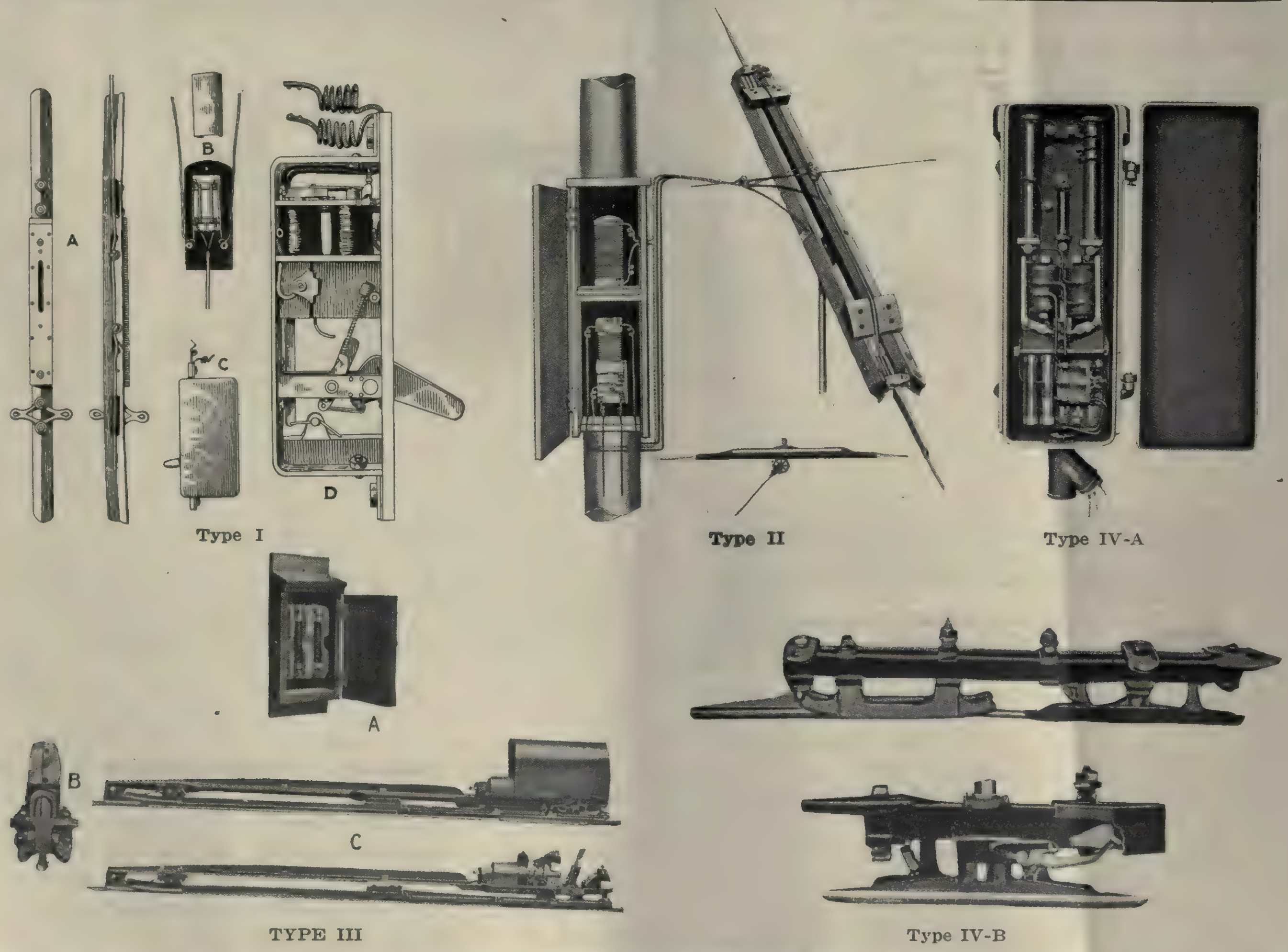


FIG. 7—WIRING DIAGRAM OF A COMPLETE MODERN ELECTRIC SWITCH INSTALLATION

The early Baldwin device was operated by an insulated section of the track ahead of the switch, while the Cheatham and Squires mechanisms were operated by overhead contactors. The Baldwin later changed to the overhead contact also. There are three other devices which appeared between 1900 and 1903. These are the Kitt which is and has been used in Denver almost exclusively; the Wooley used in East St. Louis and elsewhere to some extent, and the Collins (American Automatic). The Kitt had two solenoids in the ground box and the circuits were controlled by an electro-mechanical current reversing device. The Wooley had two contactors on the trolley wire and was operated by current "on" or "off" under one contactor or the other as the direction required. The Collins had one solenoid in the ground box and the switch was thrown by a cam plate reversing device, also in the box. (See Fig. 5.) The first Collins devices were designed for underground conduit work in New York and were first used there in 1902. The first Collins devices for regular trolley work were installed in Brooklyn in 1903. The early type of this device was contained in a water-tight box, using an ordinary stuffing box. As this gave some trouble it was superseded by the mercury seal.

It will be seen from Fig. 6 that the modern devices have abandoned the insulated section of track as a factor in their operation and have returned to the overhead wire instead, using some form of contact-making device, operated by the passage of the trolley wheel as a means for setting up circuits which actuate the mechanism.

The development of curb and tower control began about 1904 when the use of automatic switching devices commenced to make headway. The first of these were installed in the Jersey City Terminal of the North Jersey Street Railway and at the Williamsburg Bridge Plaza in Brooklyn. The first complete electro mechanical interlocking for surface street railways was devised by Collins and installed in Washington in 1908.



Type I

Type II

Type IV-A

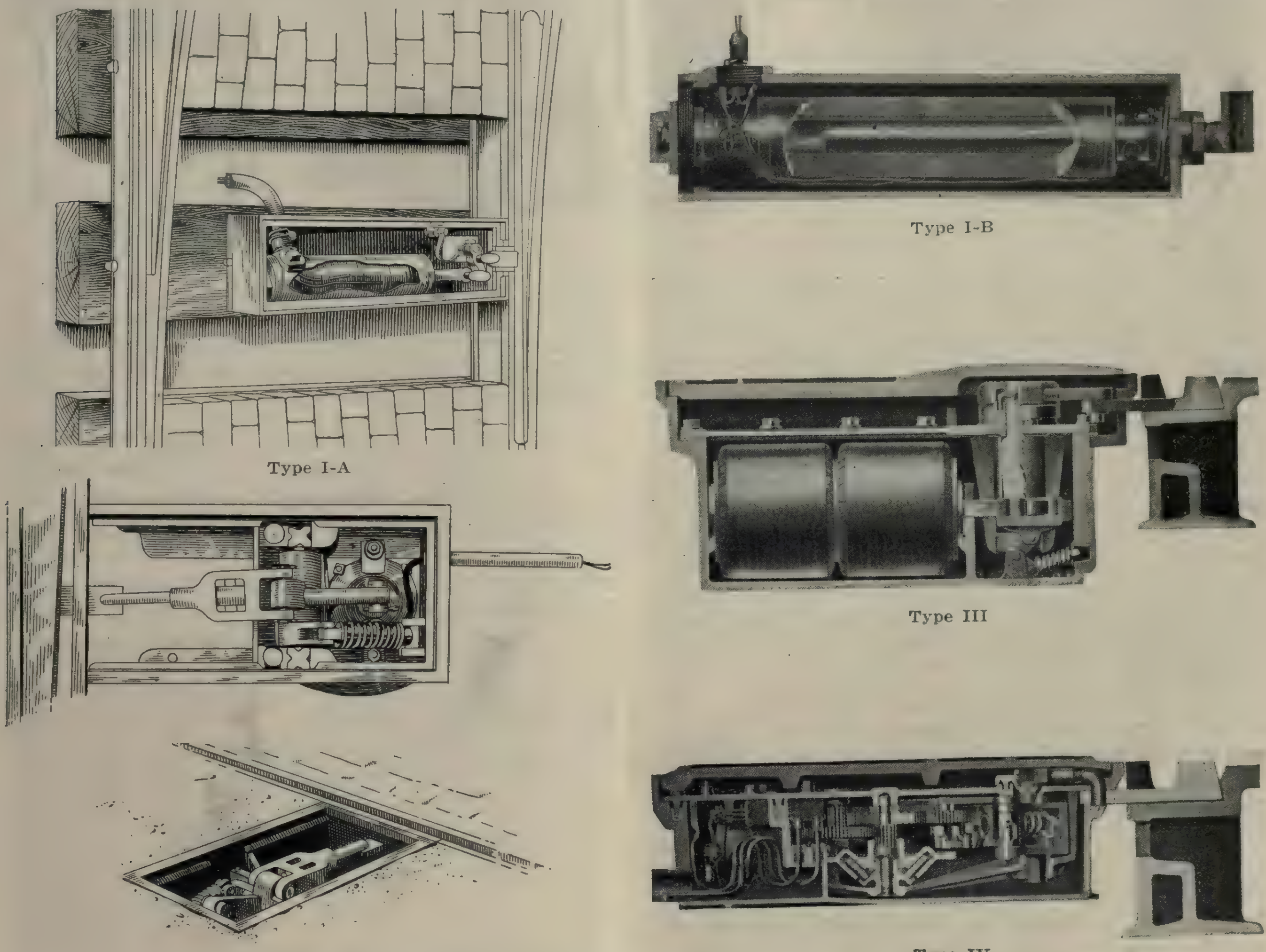
TYPE III

Type IV-B

FIG. 8—MODERN TYPES OF CONTACTORS, FUSE BOXES AND CIRCUIT CHANGERS

Type I.—*A*, trolley contact rail; *B*, fuse board and cover; *C*, circuit controller in cover; *D*, circuit controller on large scale with cover removed. Type II.—Circuit changer and overhead contactor. Type III.—*A*, fuse box; *B*, end view of contactor; *C*, side view of contactor with and without hood. Type IV.—*A*, relay box; *B*, starting and stopping contactors.

Perhaps the most radical change in electric switch design is the recent anti-splash type, operated by a small electric motor in the street box, as designed by Collins. This was introduced in 1916 and the first installation was made in Brooklyn in that year. Besides preventing splashing troubles, the device is designed for electric locking to prevent splitting and untimely operation by following cars. The same type of electric lock which is used with this device can be used with other Collins devices for locking switches against two-car train operation.


Type I-A

Type I-B

Type III

Type II

Type IV

FIG. 9—TYPES OF MODERN STREET BOX MECHANISMS FOR ELECTRIC SWITCHES

Type I.—*A*, mechanism connected to switch tongue; *B*, watertight cylinder. Type II.—Switch and switching mechanism in relative positions.

Type III.—Cast-iron box containing switch-throwing mechanism. Type IV.—Street box, mercury seated, with motor and gears.

Present-day devices consist principally of four main parts, namely, the contactor, the circuit-changer, the fuse box and the main street box. Sometimes the contact device has the circuit-changing device attached thereto, and in some cases the circuit changer is mounted upon the trolley pole at the curb. Several types of contactors, fuse boxes and circuit changers are shown in Fig. 8, while a diagram of wiring of a complete installation is shown in Fig. 7. Views of several street-box mechanisms are shown in Fig. 9.

In general the operation of the switch tongue is accomplished by means of solenoids located in the street box, but a recently developed type does this by means of a small 110-volt motor and trains of gears also located in the street box. (See Fig. 9.) The several devices shown in the figures will be recognized by those who are familiar with such apparatus, but it is not the intention here to indicate either that these are all of the devices available or to express any preference whatever as to the types of apparatus shown.

It is of some interest to note in passing that at least one modern design of street box has the solenoids in a vertical position substantially as they were in the early type shown in Fig. 3, although the means for actuating the switch tongue are radically different.

Electric Switches in Underground Conduit Operation

The application of electric switching devices to underground conduit systems on surface lines presents some difficulties not found in ordinary surface operation, since it is necessary to operate the leaves of the conduit slot in conjunction with the switch tongue, thus requiring the movement of the additional weight of the leaves. In consequence a very powerful and rugged apparatus is needed. A drawing of the mechanical connections of the principal type of apparatus in general use on

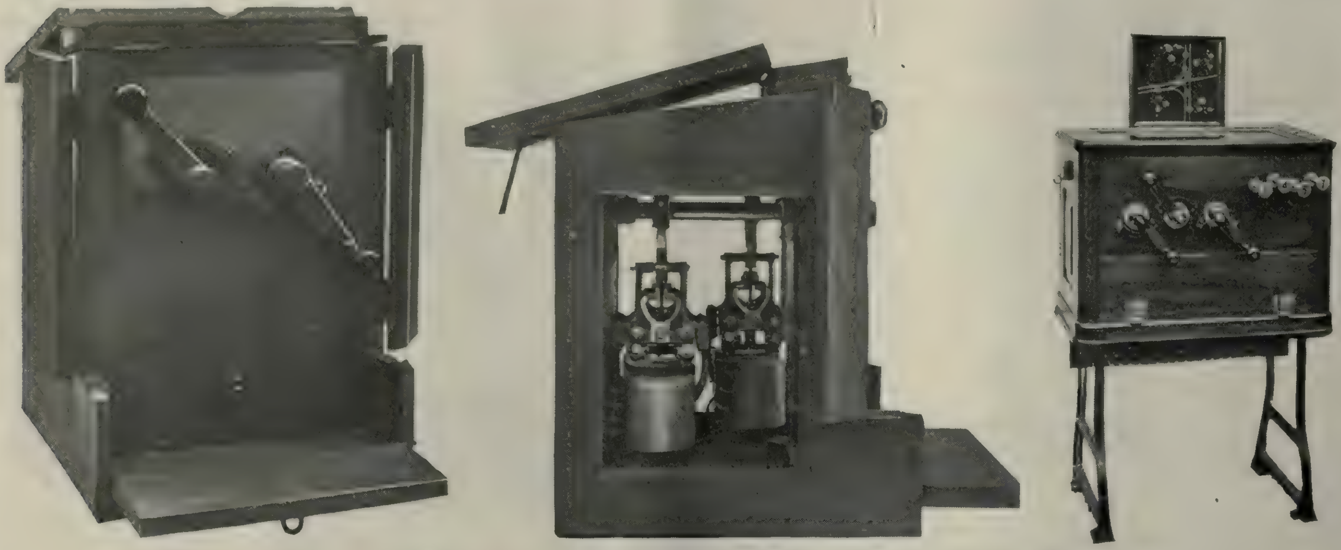


FIG. 10—TYPES OF TOWER AND CURB CONTROL FOR ELECTRIC SWITCH MECHANISMS

conduit lines is shown in Fig. 17, while a very good view of the mechanism is shown in Fig. 18, although the solenoid can not be seen, being hidden by the cylindrical casting. The type shown is in service in New York, Washington and London. It operates as follows:

The switch throwing mechanism has but one solenoid and the motion is transmitted in the two directions by means of a reversing cam plate. The particular mechanism shown in Fig. 18 also has contacts mounted upon it for use with interlocking and these operate the indicators in the tower. In the underground conduit type one of the conductor rails has an insulated section. One of the wires from the solenoid is connected to the live conductor rail and the other is connected to the insulated section.

If the motorman desires to throw the switch, current is applied to the car while the plow is on the insulated rail and the solenoid of the mechanism, being in series with the car motors, becomes energized, its plunger is lifted and the cam plate causes the switch to be thrown. When the car leaves the insulated rail the plunger and cam plate fall back by gravity and re-set to throw the switch in the opposite direction. If the switch is not to be thrown the motorman passes over the insulated section with power off. If the switch is thrown by hand the reversing cam plate also reverses. There is a toggle movement with heavy spring attached to the switch throwing mechanism to act as a semi-lock and hold the switch point and leaves in the slot rigidly in the position to which they are thrown.

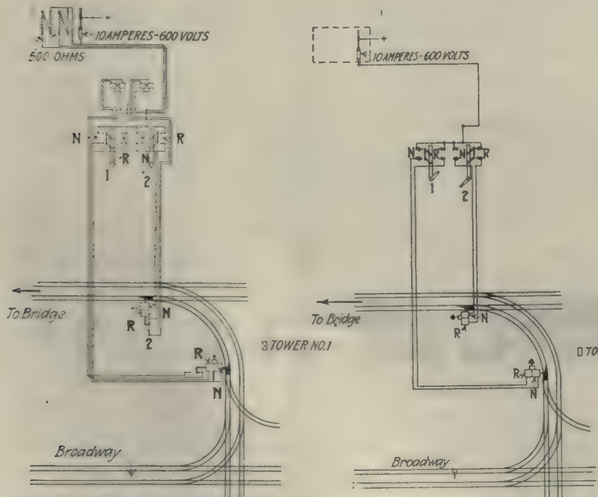


FIG. 11—WIRING DIAGRAMS; AT LEFT, TOWER CONTROL; AT RIGHT, CURB CONTROL

Severe Conditions Must Be Met

There are several rather rigid conditions which electric switching devices must meet in street railway service. They should be composed of the fewest possible parts; they should be simple enough in mechanism and electrical connections to permit the average man of intelligence to maintain them; they must be waterproof as far as the parts in the street are concerned; they must prevent any possibility of splitting the switch; they must not require more than ordinary intelligence from the motormen, and they should be non-operative under the combined current required for light, heat and air compressor circuits. Other desirable features are these: Means should be provided to prevent splashing of mud and water upon passengers and pedestrians; it should be impossible for a following car to throw the switch between two trucks of a car which may be passing over the switch; it should not be absolutely necessary

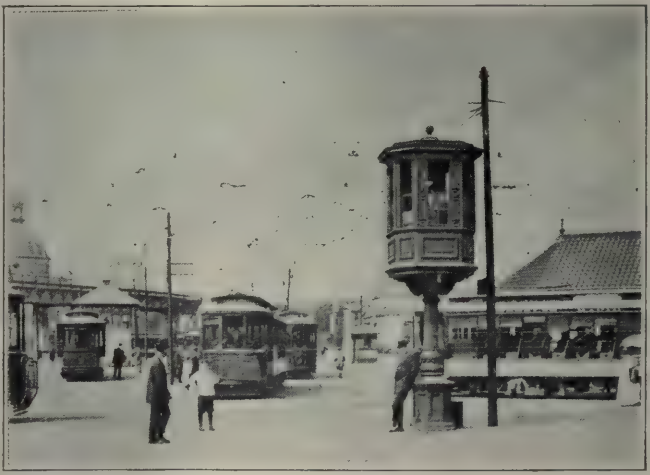


FIG. 12—TOWER CONTROL AT THE BUSY WILLIAMSBURG BRIDGE PLAZA IN BROOKLYN, N. Y.

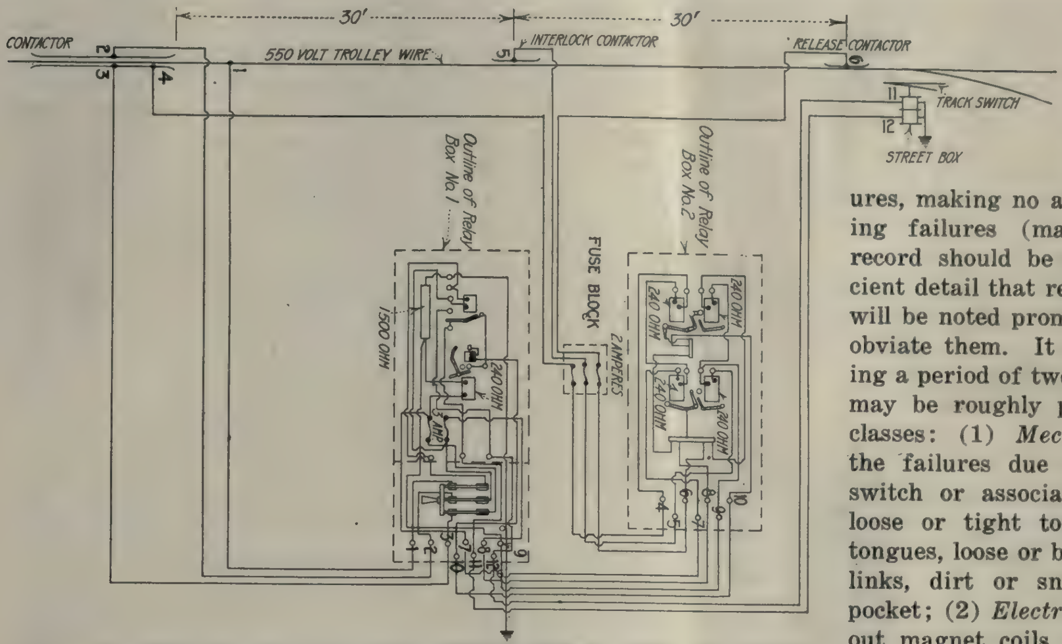


FIG. 13—WIRING DIAGRAM OF INTERLOCKING FOR ELECTRIC SWITCH OPERATION UNDER TWO-CAR TRAIN SERVICE

for the motorman to see the position of the switch in order to operate it correctly, and it should be impossible for a car to burn out the electrical apparatus by standing with trolley pole directly under the contact device. In two-car train operation, where both cars have their trolley poles in contact with the wire, it is absolutely essential that the second car of the train cannot operate the device.

These somewhat numerous requirements may be summarized into five main factors which should be considered in the selection of automatic switching devices. These are: (1) Perfection of service; (2) economical maintenance; (3) simplicity of design; (4) simplicity of installation, and (5) reasonable first cost.

Where Most of the Operating Troubles Come From

A particularly troublesome factor in connection with electric operation of switches arises from the switch pieces themselves. There are at least eight types of switch tongues which the mechanism may be required to operate. The tongues may vary in weight from 90 lb. to 240 lb. There are at least as many more methods of heel fastenings for switch tongues. It is obvious that the mechanism will work better with certain types of tongues and fastenings than with others. It follows that, in order to obtain the best results, some attention should be paid to the selection of the switch pieces with a view to securing those types which are the most reliable for electric operation. It will even be found advantageous to install the particular switch selected in all cases where electric operation is to be provided.

It has also been noted that track switches which are electrically operated are subject to more abuse from the cars and require more attention for minor repairs, such as "heel tightening," straightening or "shimming," than those not so operated. This is probably due to the fact that the cars are operated over them at greater speeds, since it is often unnecessary to stop the cars before passing over the special work. On the other hand, if the motorman must set the switch by hand, he must stop to do so and then he cannot do otherwise than pass it slowly. There are at least thirty different things which can cause failures, making no allowance for car-operating failures (man-failure). A careful record should be kept of these in sufficient detail that repeated defects or faults will be noted promptly and steps taken to obviate them. It has been observed during a period of two years that the failures may be roughly placed in three general classes: (1) *Mechanical,* including only the failures due to faults in the track switch or associated therewith, such as loose or tight tongues, bent or broken tongues, loose or bent connecting rods and links, dirt or snow and ice in switch pocket; (2) *Electrical,* including all burnt-out magnet coils or relays or resistance tubes, blown fuses, wires detached from contactors, worn contactors, defective circuit changers, worn trolley wheels, and weak tension springs in trolley bases; (3) *Operating,* such as fast operation under contactors, failure to use or not to use power at the proper time, failure to preserve proper distance from car ahead. The items of worn wheels and weak tension springs are really mechanical or equipment troubles, and failure due thereto must not be counted against the apparatus. Of course operating failures are not apparatus failures.

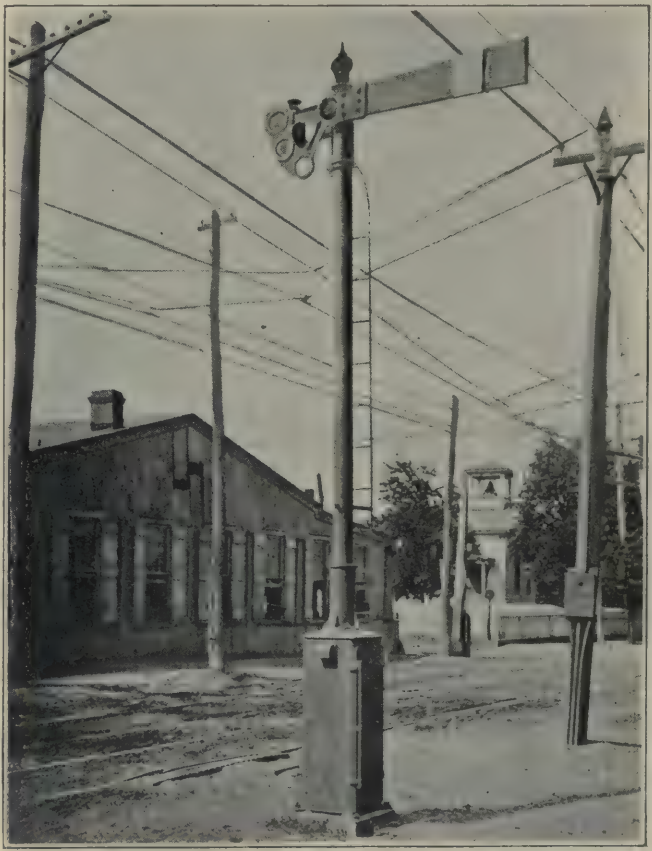


FIG. 14.—ELECTRICALLY OPERATED CROSSING DERAIL AND SEMAPHORE SIGNAL

The three groups described have been found to classify themselves into the following approximate percentages of the total "failures" reported yearly: (1) Mechanical, 15 per cent; (2) electrical, 75 per cent, and (3) operating, 10 per cent.

In connection with failures it may be said that the proper measure of electric switch performance is based upon the total number of car movements per failure without trying to classify the causes. Even this method admits of some discrepancy because very busy switches are subject to excessive heating from their almost constant use and extra trouble may be expected at such locations.

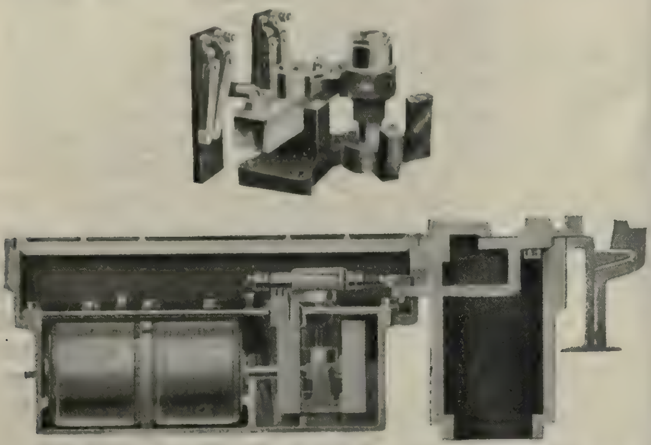


FIG. 15—DETAILS OF CROSSING—DERAIL-THROWING MECHANISM

When due consideration is given to the very onerous conditions under which electric switching devices are required to work, their performance in respect to reliability is truly remarkable. It has been observed that, upon one system having 115 devices in service, the average number of operations or movements is 863 per switch per day. The greatest number is 3026 and there are thirty-five which have from 1000 to 2000 movements per day. All the others operate over 500 times daily. There are about 38,205,000 movements per year, and it has been noted that performance records indicate failures due to defects in the device in proportion of one failure to over 46,000 operations as an average for all the switches. On another road there is a record of 117,000 operations to one failure.

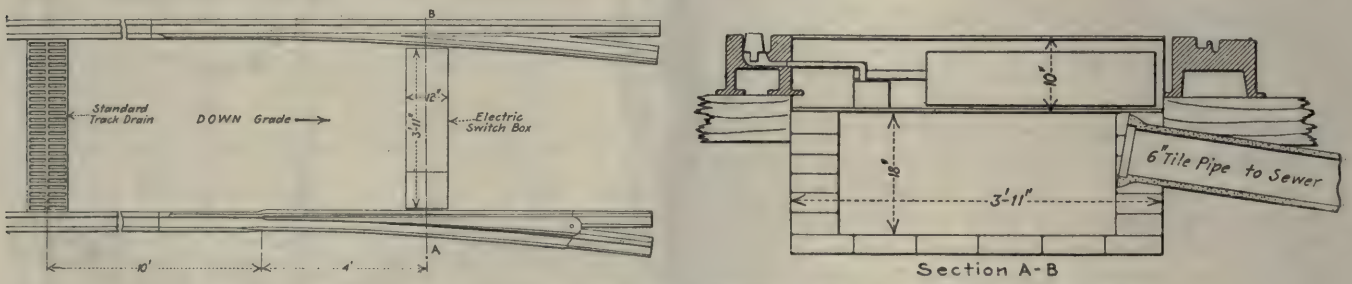


FIG. 16—TRACK SWITCH INSTALLATION SHOWING PROVISION FOR DRAINAGE

The answers to a recent question in the American Electric Railway Association "Question Box" indicate that the electrical department of most companies assumes the maintenance of what may be considered the electric parts, beginning with the contactors at the trolley wire, and extending through the relay boxes on the pole to and including the actual magnet coils in the track box at the switch. The only work required of the track department is the adjustment and maintenance of the actual mechanical parts of the tongue switch piece. On one or two roads, however, the track department takes charge from the tongue switch up to and including the relay box on the pole. This is somewhat unsatisfactory, since it divides the responsibility for electrical maintenance between two departments, leading to trouble in placing responsibility for failures and consequent duplication of inspection and emergency calls. There is also a third party, namely, the transportation department, which must assume some of the responsibility for "troubles," since failure to observe the rules on the part of the motormen can cause much trouble and damage.

Automatic Switching at Terminals and Other Congested Points

There are locations on large city systems where car traffic and street traffic are so heavy, and the track switches are so closely grouped, that it is impracticable to attempt automatic operation of the switches. These points of congestion will be found to have a car headway of from forty-five seconds to one and one-quarter minutes. In most cases the operation by switchmen is attended with difficulties, such as dodging cars and vehicles and at some personal risk. These conditions are overcome by the use of tower or curb control devices used in conjunction with the switch-throwing mechanisms of the automatic type. These control devices are shown in Fig. 10.

The tower control consists of a switch control cabinet and resistance board. The operator has in front of him in the tower an indicator board upon which is mounted a model layout of the track and switches, each model switch being electrically operated by contacts in the real switch into positions always in correspondence with its own. Mounted on the control cabinet are control handles, one for each switch and numbered the same as the model switches on the indicator board. The handles have a rotary movement of about 60 deg., being locked in position by a simple latch which the operator must lift to move the handle, thus preventing unintentional movement. Each handle operates a cam which in turn engages a swinging latch of a magnetic blow-out, quick-break switch which makes and breaks the circuits to the solenoids in the switch-throwing mechanisms in the street, throwing the switch in the direction in which the control handle is rotated. Wiring diagrams of tower control and curb control installations are shown in Fig. 11.

In cases where the operator has many switches to handle it becomes advisable to lock the control handle so that it cannot be moved while a car is passing over the switch. This is prevented by installing two small contactors in advance of the frog on the wire. The first locks the handle by means of a small magnet mounted on the control cabinet and the second contactor unlocks it by similar means after the car has passed the switch. This is a simple form of interlocking, and the difficulties created by two-car trains are now being overcome by a similar arrangement applied to the regular automatic devices. A wiring diagram showing how this is accomplished should be of interest. One is presented in Fig. 13.

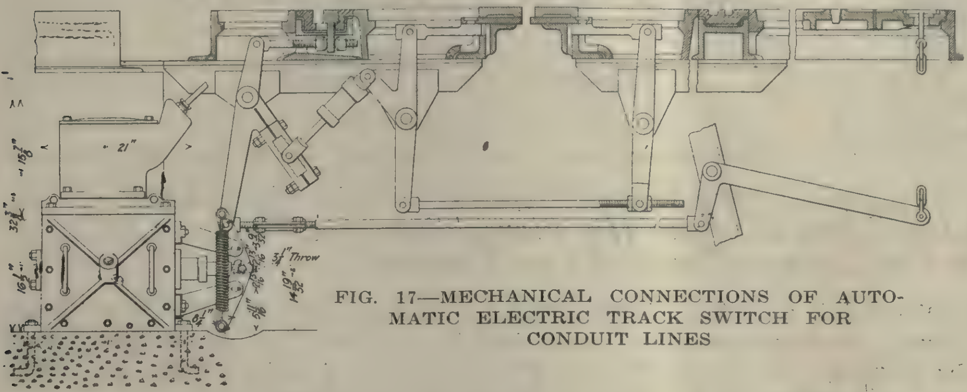


FIG. 17—MECHANICAL CONNECTIONS OF AUTOMATIC ELECTRIC TRACK SWITCH FOR CONDUIT LINES

Apparatus for Operation of Derails at Crossings

A situation somewhat analagous to the traffic conditions at congested points is found at busy surface crossings of steam and street railway lines. At these places, in addition to the crossing gates, it is a safety requirement that the crossing be protected by derailing devices. Where there is a man required to operate the gates, there is no added labor cost for operation of derailing devices. The electric switch mechanisms lend themselves readily to adaptation for this service. The control device as well as the operating mechanism is substantially the same, and it is only necessary to add a semaphore to complete it. Such an installation is shown in Fig. 14, while the operating mechanism is shown in Fig. 15.

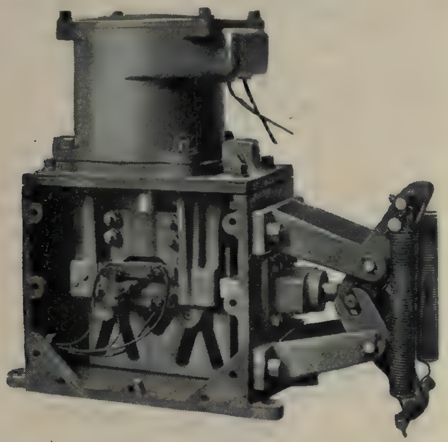


FIG. 18—MECHANISM OF ELECTRIC TRACK SWITCH FOR CONDUIT LINES. SOLENOID IS INCLOSED IN CAST CYLINDER ON TOP

The maintenance of electric switches, where there are very many to care for, will require the exclusive services of from one to five men. When their number reaches a hundred or more the latter number of men will have plenty to do as a rule, and they are provided with an automobile for quickly reaching trouble points and covering a large territory. In connection with maintenance the following description of methods for overcoming troubles during the winter season is worth quoting. It is from an article by P. Ney Wilson, covering the practice on the lines of the Connecticut Company at New Haven.

Preventing the Freezing of Electrically Operated Switches

The problem of preventing freezing of switches on the lines of the Connecticut Company is a difficult one on account of the wide variation of temperature and weather conditions. The New Haven lines alone have twenty-seven electrically operated switches and sixty patented spring boxes of various designs. Aside from salting, which is a common practice, we find the following procedure very satisfactory.

1. When new switches are installed at any season of the year, the tongue and heel tightening device is removed, oiled and carefully adjusted, and the heel box is filled completely with oil-soaked waste.
2. Electrically operated switches require regular inspection and adjustment. A settling box is built under them, connected directly to the sewer. When the switch is installed in a water pocket a track basin is placed so that it will catch sand and dirt before it reaches the switch piece. Salting in snowy weather and oil in dry weather will keep these switches free for satisfactory service.
3. "Anti-kick" spring boxes not equipped with a stuffing box are cleaned and oiled and then filled completely with oil-soaked waste plus a little salt. The waste is packed loosely around the working parts, and care must be taken that it does not interfere with their operation. This treatment applied twice during an ordinary winter will practically eliminate trouble due to freezing.
4. In all spring boxes in which plunger connections operate through a stuffing box the tight compartment should be kept filled with compressor oil.
5. As to the salting of switches at night, we find that the sending of one or more cars over the lines is the cheapest and most effective method of keeping the switches free. These cars salt switches, run through all special work not in regular use and operate all automatic switches.

A Reasonable Amount of Maintenance Necessary

In conclusion, it may be said that electric switching devices, like all other mechanisms, cannot be expected to work perfectly under all conditions and at all times. There are too many adverse factors constantly working to put them out of commission. It can only be expected that a fairly high degree of operating perfection will be obtained, and the measure of success in this will be almost wholly dependent upon the care which is given to the apparatus by the maintenance organization. It must not be expected that the devices will maintain themselves. On the contrary, they require that reasonable amount of inspection and adjustment which should be given to all mechanical and electrical devices.

"All the Trash in the River Wants to Get Into this Condensing Water Intake"

Keeping Condenser Performance Up to the Mark

By
Hartley Le H. Smith
CHIEF OF TESTING BUREAU
BROOKLYN RAPID TRANSIT SYSTEM

The Power Station Engineer Is Told How He Can Determine the Economy Which He Should Get from His Plant, Then How He Can Correct Causes of Low Vacuum

IN THE writer's article on "Diagnosing and Correcting the Causes of Low Vacuum," which appeared in the Sept. 21 issue of the ELECTRIC RAILWAY JOURNAL, the point was made that the variable which exerts very great effect upon condenser vacuum—at the top of the condenser, as elsewhere, and hence in the turbine exhaust connections—and yet which is in no way within the control of the engineer, is the intake temperature of circulating water. It is therefore the rigorously independent variable in condenser performance, and standards of condenser maintenance can only be established as matters relative to it. So important is it in turbine stations that not only does it serve as primary criterion for condenser vacuum maintenance but for comparisons of over-all station economy, or thermal efficiency, as well. A writer in the *Electrical World* of Sept. 28 notices this and illustrates it with a curve drawn between intake circulating water temperature and kilowatt-hours per gallon of fuel oil in an oil-burning power plant. (This curve is reprinted on page 703 of this issue.)

Economy Measured by Vacuum in Terms of Intake Water Temperature

The establishment of the relationship which exists between the highest practically obtainable turbine economy, or power plant over-all economy, and the vacuum in the top of a condenser and at the turbine exhaust nozzle, may be gotten in one way or another, dependent upon test facilities and circumstances, but that relationship which is within the reach of all is to determine the highest vacuum actually attained in terms of intake circulating water temperature. This only requires records of observations kept over a considerable period of time, and naturally the longer the better. All sorts of variable factors conspire to make most observations noticeably less excellent than the best actually attainable, so that in the direction of *poor* results the figures scatter in a haphazard manner when plotted, but in the direction of *best* results they mark out a boundary line which is both smooth in shape and rational in form.

Such a plot is shown in Fig. 1, extending over a period of only about six months and taken in a typical turbine power plant. It covers data not only from nine different turbine-condenser units, but these units happen to be divisible in the matter of design into groups of three distinct types. All three types are represented at or very near the boundary line.

It is very significant that a plot of the sort shown in Fig. 1 proves that vacuum maintenance at the top of a surface condenser becomes handicapped by the rise of circulating water entrance temperature which takes place during the summer. This is due not merely to the direct effect of the rising temperature but to secondary effects as well, which are somewhat involved but are undoubtedly connected with the rising height of the air cloud, caused by the decreasing efficiency of air removal by the pump equipment during hot weather. To state the over-all effect briefly it may be said that any plot of the kind shown in Fig. 1 will reveal greater temperature difference between the steam temperature at the top of the condenser corresponding to saturation pressure and the entering temperature of circulating water during summer than during winter.

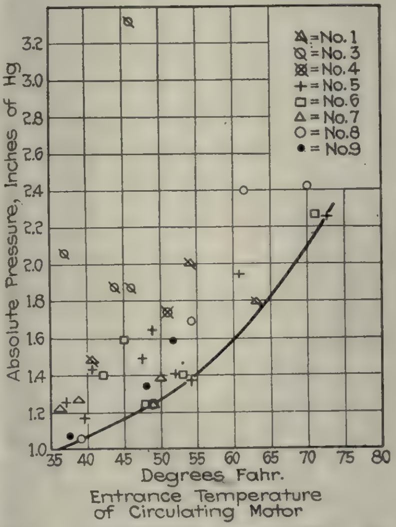


FIG. 1—VACUUM OBTAINED IN TERMS OF INTAKE CIRCULATING WATER TEMPERATURE

The curve of highest possible plant economy is obtained from the best of these readings.

After the establishment of such a standard it ought to be possible to make a strong drive after good condenser vacuum maintenance, because the operator can tell just how far he can go in condemning the indifferent performances shown by observation, regardless of the season of the year. This should make possible the drawing up in the course of perhaps another year of a new standard plot which would not only better the old one with respect to the boundary line of best performance but would be characterized also by less profuse scattering upward into the region of poor and even very poor performance. Such improvement in the standards of performance could hardly be expected to be continuous from year to year, but it ought to be the result of this sort of intensive and scientific analysis of vacuum maintenance that the first standard established even by accumulations of very considerable data would fall short of what might in time come to be regarded as the ultimate standard.

While it would unquestionably be desirable to make a careful analysis of the vacuum maintained by each condenser every day, yet in a plant with numerous turbines it becomes a matter for decision as to whether brief observations should be made on all machines operating or whether much more extended observations should be made on two or three machines so that really detailed diagnosis of their ailments may be followed by equally detailed recommendations of the particular kinds of maintenance work necessary. The writer is inclined toward the latter view. Whatever the nature of one's inclinations, however, it comes back to the fact that detailed recommendations cannot be made unless they rest upon adequately detailed observations and analysis of observations.

Reasons for Form Suggested for Tabulating Condenser Data

Illustration of a form for observations of the detailed type is shown in Fig. 2. This form grew out of a form which merely provided for checking up condenser mercury columns, and bears distinct traces of its lineage. The items under "Condenser Performance Data," however, cover in a pretty thorough manner the kinds of data which not only suffice but are required for detailed diagnosis. The order of arrangement of the items may possibly be open to some criticism. In a general way, however, those items are listed first which are matters of direct observation, and they are followed by items which involve some calculation or which are of perhaps secondary importance, and the last item is one which, although of great importance, is quite special in the sense that it could not possibly be obtained simultaneously with the others.

The circulating water discharge temperature is put high upon the list because, while it is the circulating water intake temperature and the quantity of water circulating and the turbine load which establish the circulating water discharge temperature, it is this latter temperature which establishes directly, but in a complex manner, the steam temperature at the top of the condenser and therefore the vacuum in the turbine exhaust nozzle, and therefore the economy of the turbine under consideration.

Next come data of the rises of temperature through the several passes of the condenser, be they two or three. These data are of very great importance because it is a common thing for a most unseemly great proportion of the total rise to occur in the upper pass. This means congestion of heat absorption in the upper pass with consequent undue excess of entering steam temperature above the discharge water temperature, and meanwhile the large investment representing the lower part of the condenser is not earning adequate money. Great preponderance of heat absorption in the upper pass is sure evidence of improperly proportioned steam pasageways through the condenser, or the presence of a cloud of air which has risen to rather high level in the condenser. This latter, if it exists is due to large air leakage into the condenser or poor efficiency of air removal, or both.

It is the business of the diagnostician to clear up contingent possibilities and become specific. If a condenser has improperly proportioned steam passageways, presumably the diagnostician knows it by general acquaintance with steam condenser technical literature of recent years, and calls it to the attention of those in authority who do not know it, if there are any such, and plans are made to provide more adequate steam spaces by permanently removing tubes. If large air leakage into the condenser exists, quantitative measurement of the leakage with an air bell will reveal it. Rotary pumps of the jet type, as distinguished from reciprocating dry-vacuum pumps, do not admit of the use of an air bell. Very good work in such circumstances can be done by applying Dalton's law to simultaneous observations of temperature and pressure in the air suction line. Provision for the result of such measurements is made on the line next to the last of

T. D. CO., TESTING BUREAU

VACUUM MAINTENANCE AND CALIBRATION OF CONDENSER VACUUM GAUGES.

Sheet No. 1. T. B. Order........ Williamsburg Power Station

Date	Condenser No.	Found Reading Inches of Hg.		Left Reading Inches of Hg.		Barometer	Load Kw.	Temp. of Cir. Water F.°		R.P.M. of Pumps	
		Stand. Hg Column	Cond. Hg. Column	Stand. Hg. Column	Cond. Hg. Column			Intake	Disch'ge	Air	Cir-Water
......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	} Bristol					
......	......	......	......	......	......						
......	......	......	......	......	......						

CONDENSER PERFORMANCE DATA

Condenser Number,			
Absolute Pressure, Inches of Hg.,	......	......	......
Speed of Air Pump, R.P.M.,	......	......	......
Speed of Circulating Water Pump, R.P.M.,	......	......	......
Circulating Water Discharge Temperature,	......	......	......
Temperature Rise of Circulating Water, Upper Sect.	......	......	......
Temperature Rise of Circulating Water, Middle "	......	......	......
Temperature Rise of Circulating Water, Lower "	......	......	......
Load K.W.,	......	......	......
Pressure on South Gland, Lb. per Sq.In.,	......	......	......
Condenser Hours since Last Cleaning,	......	......	......
Millions of Pounds of Circulating Water per Hour,	......	......	......
Diff. Pressure across Condnsr. (Ref. to Rated Water),	......	......	......
Water Level Intake,	......	......	......
Lost Head with Rated Qnty. of Circulating Water, Ft.,	......	......	......
Excess Temperature of Steam over Discharge Water,	......	......	......
Air Pressure in Air Suction Line,	......	......	......
Absolute Pressure in Clsd. Suction Line of Air Pump,	......	......	......

FIG. 2—FORM FOR TABULATING DETAILED CONDENSER PERFORMANCE

the illustrated form, Fig. 2. It should be noted that if measurements in the air section line are made with the purpose of applying Dalton's law, refinement of measurement should be attempted because rotary pumps of the jet type frequently have quite large displacement, with the result that if small or moderate quantities of air are leaking into a condenser the air in the act of withdrawal may be diffused through such a very great volume of very low pressure steam as to make the detection of the presence of the air, and much more its quantitative measurement, a matter of difficulty. There is the consolation, however, that if air is being withdrawn in large quantity the detection of its presence in the air suction line will not be difficult. It should be remarked also that the Dalton law method of quantitative measurement of air removal from a condenser is just as applicable to dry-vacuum pump installations as to the others, subject only to the difficulties incurred in pressure measurements in pipe lines supplying any sort of reciprocating pumps.

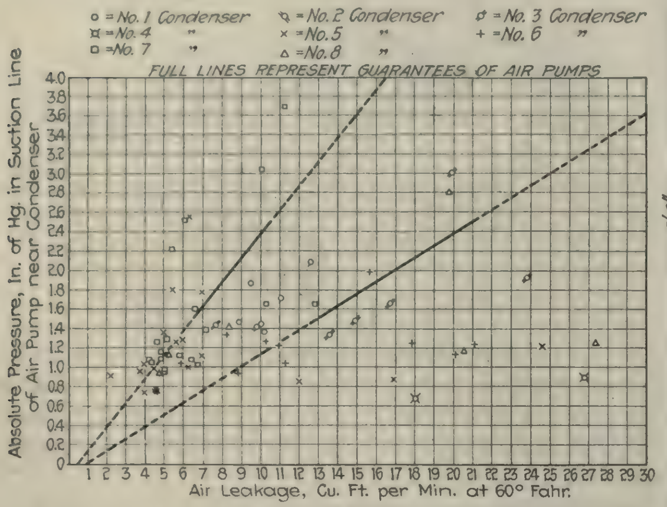


FIG. 3—CHART FOR COMPARISON OF ACTUAL WITH GUARANTEED AIR LEAKAGE

Other Possible Faults to Which the Form Calls Attention

It may suffice to take up somewhat briefly a number of the remaining items of importance appearing in the form shown in Fig. 2. Where water-sealed glands serve to prevent air from entering the turbine the pressure of water maintained on the gland supply lines by normal pumping action indicate normal or abnormal functioning of the glands with respect to water consumption. If, for instance, the water consumption becomes abnormally large the water pressure will fall and the air-sealing efficacy of the gland will be interfered with, with consequent high air leakage and low condenser vacuum.

The hours that a condenser has run since its last cleaning may affect the vacuum in two ways—it may account for a falling away from the normal quantity of circulating water by reason of trash accumulations actually obstructing the flow, and it may interfere with the transmission of heat through the tubes to the water by reason of the heat insulating effects of mud or sediment in the tubes. The hydraulic circuit of the condenser is capable of being handled much like an electric circuit. The differential pressure across a condenser varies greatly with the quantity of water flowing through it, but it also varies considerably at constant water flow with different amounts of trash obstructing it, particularly if the obstructing material is to a considerable extent leaves which become plastered over the tube plate.

Again, where open intake wells are used, the fluctuation of levels in them may depend upon more than mere tide level variation. Measurable lost head may occur in them due to perforated openings designed to stop obstructing materials which might be harmful to the circulating pumps. Variation of quantity of water circulated due to any cause will then cause variation of this lost head, but if at some constant quantity of circulating water the lost head in the circulating pump suction line increases to values appreciably above normal the the bottom of the open intake well may need cleaning out.

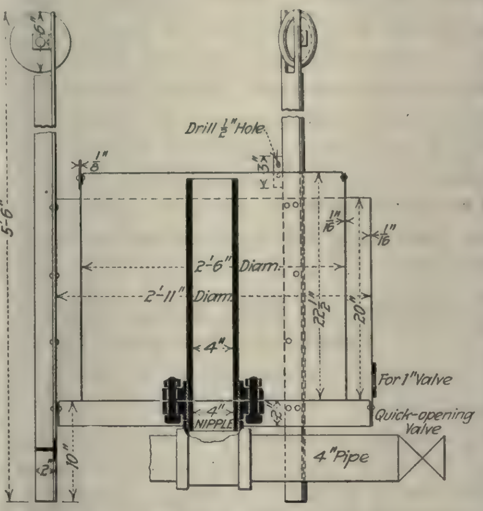


FIG. 4—AIR BELL FOR MEASURING AIR LEAKAGE

The absolute pressure which an air pump can maintain against a closed suction value has been discussed before. Nothing is more important in vacuum maintenance. It is the prime indication of the pumping ability of the pump. To show forcibly how even the degree of air leakage itself is not more important and may in some installations be distinctly less important than the air-tightness and general perfection of mechanical working of parts, Fig. 3 is published, showing absolute pressure in the suction lines of various pumps in actual service with large variations of air leakage coming through the air suction lines from the condensers. The quantities of air leakage were measured by an air bell. The solid portions of the ruled straight lines were drawn through actual guarantees of the performance of a certain type of rotary pump in which water jet action extracts the air; the upper line representing one pump and the lower line two. The numerous plotted points all represent actual service performance of reciprocating dry-vacuum pumps. The lesson from the plot is clear. If a reciprocating pump is in fine condition it may be capable of removing a great amount of air from a condenser and yet maintain admirably low absolute air pressure while it is doing so. On the other hand, through neglect of skillful maintenance work the absolute pressure may not be notably low even though the air leaking into the condenser and needing to be removed by the pump may be moderate in amount, thanks to a tight condenser.

The use of an air bell gives such powerful means of control of vacuum maintenance by putting air leakage measurement upon a quantitative basis that an illustration of such a bell may be of interest, and is accordingly shown in Fig. 4. An air bell made from this drawing has been in satisfactory service for several years. The conception of using such a bell for the purpose did not originate with the company with which the writer is connected. So far as he knows it was first used by the New York Edison Company.

As a refinement in the use of an air bell, a hole may be drilled in the top of it and a rubber stopper inserted through which is passed an ordinary chemical thermometer. In this way the temperature of the air may be measured as the bell rises. This allows correction of the air volume to standard temperature to be made.

Relative Life of Manganese and Open-Hearth Rail on Curves

Results of Tests Are Given Showing Manganese Rail to Wear About Seven Times as Long as Open Hearth

By H. W. Roberts
Assistant Engineer of Maintenance of Way, Elevated Railroads of Chicago

The accompanying diagrams, which show the wear of rail on the curves of the Chicago Elevated Railroads, will be of interest to the engineering profession in general, as they give a direct comparison between the life of manganese and high-carbon, open-hearth rail.

The curves on which these measurements were taken are all laid with 80-lb. rail, A.S.C.E. section, and are all guarded. The throatway between the running rail and the guard rail is 2 in. on the short-radius curves, and 2¼ in. on curves having radii of more than 500 ft. The elevation of the outer rail is not uniform on the various curves, on account of special conditions which must be met, but in general it will run about as follows: For curves having radii less than 250 ft., 4 in.; 250 ft. to 500 ft., 3 in.; more than 500 ft., 2 in.

The wears on the outer and inner rails are given separately, as the wear on the outer rail is somewhat more than that on the inner rail. Speaking generally, however, the life of the two rails is the same, for the reason that by the time the outer rail is worn out, the inner rail is either so badly corrugated or so badly battered at the joints that its removal is also necessary.

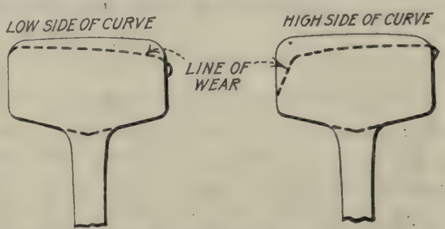
The unit of wear which is used is the reduction in the area of the head of the rail in square inches per 100,000 cars; and it was so taken in order that the measurements made on the different branches, where the traffic varies widely, might be reduced to the same basis. The total wheelage over each curve was arrived at by taking the traffic for representative days and applying this as a unit over the entire period. There is, undoubtedly, a small error in the totals arrived at in this manner, but the percentage of error is so small that it is negligible.

The equipment, at the present time, consists of 1095 motor cars and 575 coaches, the average weight of all equipment being 50,000 lb. per car. The heaviest cars are the steel motors which weigh 69,000 lb., 41,000 lb. on the motor truck and 18,000 lb. on the trailer truck, while the lightest are the coaches, which weigh 33,000 lb.

These cars are all equipped with M.C.B. standard rolled-steel wheels, 34 in. in diameter on the motor trucks and 31 in. in diameter on the trailer trucks. The motor cars are each equipped with two 160-hp. motors, are braked at a high percentage, and are operated in multiple-unit trains of from two to six cars each. The number of coaches per train bears about the same relation to the total number of cars per train as the total number of coaches bears to the total number of cars on the system.

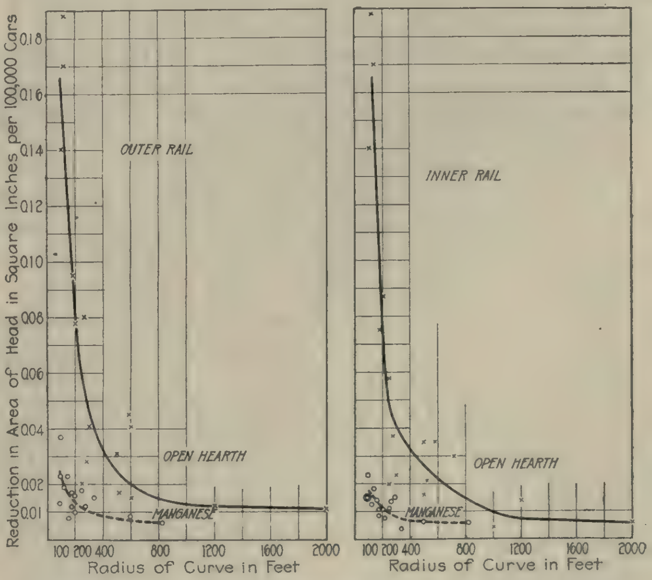
The maximum wear was found to have been reached when the area of the head of the rail had been reduced by 1.25 sq.in. This was arrived at by taking a number of sections of rail which had been removed from the track, or which was so badly worn that its removal was an immediate necessity.

The accompanying rail sections are from manganese rail which had been in the track for 4½ years. This same rail has now been in service for nearly six years and is still in good condition. The best result ever obtained with open-hearth rail on the curve containing this rail, which has a radius of 100 ft., was a life of fourteen months, while the average life for open-hearth rail was less than ten months. On another curve of the same radius we have manganese rail which has been in service for seven years, and the average life of open-hearth rail on this curve was also less than ten months.



DIAGRAMS SHOWING WEAR OF HEAD OF 80-LB. MANGANESE STEEL RAIL A.S.C.E. SECTION, LAID IN 1912

These results show that the comparison of the wear on the two kinds of rail, as shown on the diagram, is conservative, as the diagram shows the life of manganese rail to be about seven times that of open-hearth rail on curves having a radius of 100 ft.



CURVES SHOWING COMPARATIVE WEAR OF OPEN-HEARTH AND MANGANESE STEEL RAILS ON CURVES

Original area of head of 80-lb. rail, 3.30 sq.in.
Area of head of worn rail, 2.05 sq.in.

The study described above and the diagrams reproduced in connection with this article were made by the writer for B. J. Fallon, engineer of maintenance of way Chicago Elevated Railroads.

Short, Timely Articles
FOR THE
Way, Mechanical and Electrical Departments

Keeping Account of Trucking Costs

The New York State Railways Secures Economical Truck Operation by Making Careful Analysis of Detailed Cost Records

BY C. L. CADLE
Chief Engineer New York State Railways, Rochester Lines

ECONOMY in motor-truck operation is quite as dependent on good operating and accounting practices as in any other business. Systematic operation is usually economic operation, and correct bookkeeping permits of the ready detection of excessive operating charges and affords the only trustworthy source of data for basing comparisons of the economic efficiency of different makes of machines and the relative value of different kinds of supplies. The practice of the New York State Railways, Rochester Lines, with reference to the dispatching of motor trucks was described in the ELECTRIC RAILWAY JOURNAL for Jan. 5, 1918, page 45. In response to some inquiries as to operating costs, the data in the accompanying tables are presented.

The gasoline-motor-operated vehicles of this company can be divided into three general classes: line trucks, delivery cars and service cars. The physical characteristics of the first two classes are set forth in Table I. The service cars are runabouts used by the several heads of departments in conducting their inspection work. The duty of these cars cannot, of course, be compared with that of the trucks, but the data are interesting from the standpoint of showing the operating costs of so-called pleasure vehicles.

To faciliate analysis the several costs, together with the car-mileage for each truck, are tabulated each month for the month and for the year ending with that month, on a form similar to that shown in Table II. The cost figures here presented are for the month of December, 1917, and for the year ended Dec. 31, 1917. The figures under the heading, "Cents per Car-Mile," which are found on the lines beginning "Average," are calculated by dividing the corresponding total cost for all trucks by the mileage for all trucks. The remainder of the table, it is believed, is self-explanatory. The high tire cost for trucks 2, 4, 5, 20 and 22, resulted because the

TABLE I—SERVICE AND PHYSICAL CHARACTERISTICS OF TRUCKS

Tuck No.	Weight of Machine, Pounds	Carrying Capacity, Pounds	Total Weight, Pounds	General Equipment	Motive Power	Class of Work Normally Assigned to Each
2	6,000	2,000	8,000	Line and wrecking tools	Gasoline	Overhead line work
3	6,000	2,000	8,000	Line and wrecking tools	Gasoline	Overhead line work
4	6,000	2,000	8,000	Line and wrecking tools	Gasoline	Overhead line work
5	6,000	2,000	8,000	Line and wrecking tools	Gasoline	Overhead line work
20	6,450	4,000	10,450	None	Gasoline	Delivery purposes
21	3,000	1,750	4,750	None	Gasoline	Delivery purposes
22	3,500	1,500	5,000	None	Gasoline	Delivery purposes
23	5,000	4,000	9,000	None	Gasoline	Delivery purposes

TABLE II—COST OF OPERATING MOTOR VEHICLES

Car No.	Car Mileage		Gasoline				Oil				Tires				Repairs				General				Total			
			Month		Year		Month		Year		Month		Year		Month		Year		Month		Year		Month		Year	
	Month	Year	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile	Total Cost	Cents per Car-Mile
White 2	652	7404	$89.50	13.7	$642.63	8.6	$8.01	1.2	$48.75	0.6	$13.65	2.1	$834.21	11.2	$44.08	6.7	$525.23	7.1	$8.76	1.3	$175.04	2.3	$164.00	25.1	$2225.86	30.06
White 3	335	4164	61.72	18.4	601.46	14.4	5.97	1.7	44.57	1.0	12.60	3.7	50.49	1.2	24.21	7.2	182.60	4.3	8.76	2.5	175.04	4.1	113.26	33.8	1054.16	25.31
White 4	400	6635	70.64	17.6	606.15	9.1	5.61	1.4	48.21	0.7	3.30	0.8	826.78	12.4	57.94	14.4	471.10	7.1	8.76	2.1	175.08	2.6	146.26	36.5	2137.32	32.06
White 5	574	6863	68.67	11.9	602.89	8.7	5.30	0.9	54.11	0.7	6.10	1.1	1404.31	20.4	142.45	24.8	910.96	13.2	8.76	1.5	175.08	2.5	231.29	40.2	3147.35	45.85
Average	490	6266	$72.63	14.8	$613.28	9.8	$6.15	1.3	$48.91	0.8	$ 8.91	1.8	$778.98	12.5	$ 67.17	13.7	$522.47	8.4	$8.76	1.7	$175.06	2.8	$163.70	33.4	$2141.17	34.3
Seldon 20	805	10415	$84.88	10.5	$721.51	6.9	$7.90	0.1	$68.69	0.6	$4.85	0.6	$422.43	4.0	$189.89	21.1	$679.10	6.5	$8.77	1.0	$180.07	1.7	$296.29	35.5	$2071.80	19.81
Ford Jwt 21	685	8347	45.78	6.6	429.55	5.1	5.65	0.8	69.56	0.8	0.00	0.0	169.70	2.0	146.58	21.4	731.89	8.7	8.77	1.3	175.08	2.0	206.78	30.2	1575.78	18.87
White 22	815	8107	57.04	7.0	412.18	5.1	4.94	0.6	34.04	0.4	171.97	21.1	549.37	6.7	51.56	6.3	289.04	3.5	8.77	1.0	174.76	2.1	294.28	36.1	1459.41	18.00
White 23	870	3562	60.26	6.9	196.47	5.5	5.97	0.6	18.96	0.5	14.73	1.6	18.16	0.5	4.06	0.4	58.69	1.6	8.77	1.0	48.03	1.2	93.79	10.7	340.31	9.55
Average	794	7608	$61.99	7.9	$439.93	5.8	$6.12	0.7	$47.85	0.6	$47.89	6.0	$283.91	3.8	$98.02	12.3	$439.68	5.0	$8.77	1.1	$144.48	1.9	$222.78	28.1	$1361.82	17.90
Ford 30	812	10385	$9.30	1.1	$166.52	1.6	$2.50	0.3	$7.14	0.1	$19.80	2.4	$195.80	1.8	$44.03	5.4	$167.12	1.6	$8.77	1.0	$156.01	1.4	$84.40	10.3	$692.59	6.66
Ford 31	800	8515	9.55	1.2	143.72	1.6	2.14	0.2	6.93	0.1	4.86	0.6	108.10	1.2	22.64	2.8	112.38	1.3	8.77	1.0	156.00	1.8	47.96	6.0	527.13	6.19
Ford 32	543	12590	19.22	3.5	208.80	1.6	4.20	0.7	9.24	0.1	2.25	0.4	101.59	0.8	9.10	1.6	111.11	0.8	8.77	1.6	156.00	1.2	43.54	8.0	586.74	4.66
Ford 33	329	7643	11.45	3.4	118.11	1.5	2.72	0.8	4.80	0.1	1.00	0.3	95.16	1.2	19.06	5.8	125.93	1.6	8.77	2.6	156.00	2.0	43.00	13.0	499.98	6.54
Overland 34	350	5353	12.68	3.6	110.10	2.0	0.71	0.2	3.83	0.1	34.55	9.8	282.22	5.2	27.60	7.8	157.39	2.9	8.77	2.4	98.33	1.7	84.31	24.0	651.87	12.17
Ford 35	329	329	13.07	3.9	16.31	4.9	2.84	0.8	3.32	0.1	0.00	0.0	0.00	0.0	34.41	10.4	46.56	14.1	8.77	2.6	8.77	2.6	59.09	17.9	74.96	22.78
Average	533	7469	$12.54	2.4	$127.26	1.7	$2.52	0.5	$5.88	0.1	$10.41	2.0	$130.48	1.7	$26.14	4.9	$120.08	1.6	$8.77	1.7	$121.85	1.8	$60.38	11.5	$505.54	6.8

Editor's Note—In the original table the garage cost per month of $2.62 for each truck or car was itemized separately. However, on account of space limitations it has been included in the general charges listed in this table.

trucks were equipped with pneumatic tires when originally purchased. It was found after considerable experience that a special solid tire purchased from the Overman Company, New York, gave the best tire economy on a car-mile basis. These tires cost approximately $650 for one complete set, dual rears and single fronts. Offsetting this cost, however, is the fact that these tires have a guaranteed mileage of 15,000 as against 6000 miles for the pneumatic tires. Our experience has been that the use of these tires reduces our tire cost per car-mile by about 50 per cent.

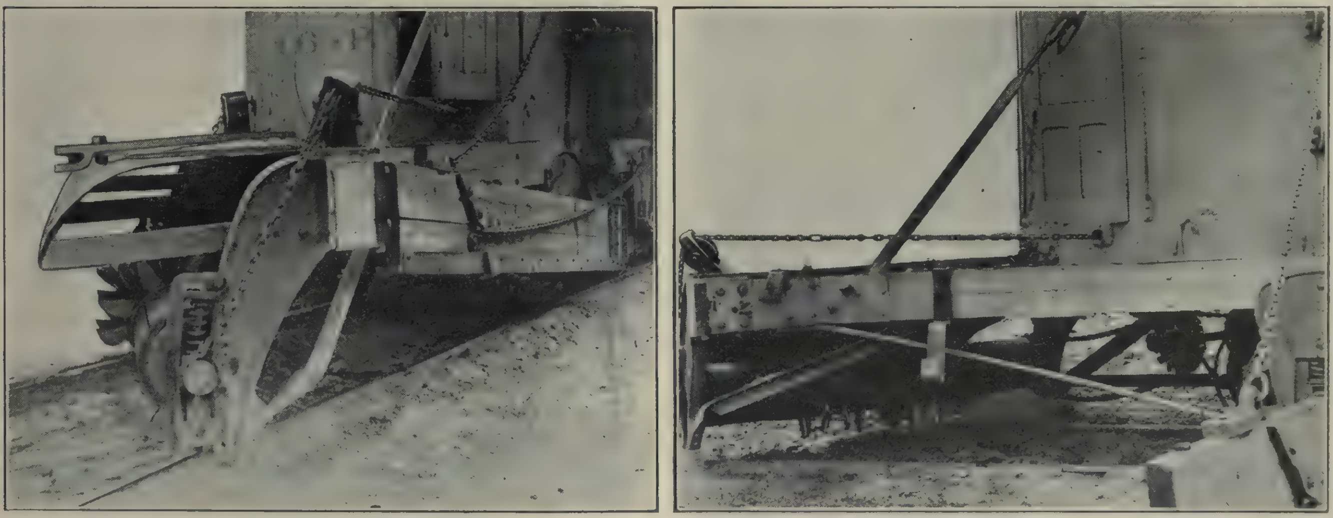
Ice Cutter Made From a Snowplow

A Simple but Effective Device Which Proved a "Life-Saver" in Schenectady Last Winter

FOR use in the winter of 1916-1917 the Schenectady (N. Y.) Railway constructed the ice-cutting attachment for one of its snowplows which is shown from two angles in the accompanying illustrations. The plow was one of several that had been built some time previously in the company's shops. The rigging can readily be placed on a sweeper body, using materials available in any shop storeroom.

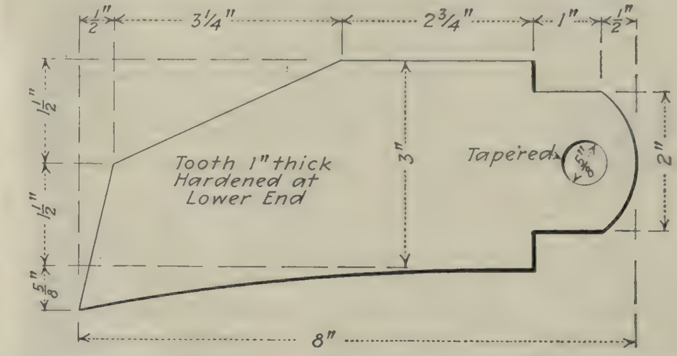
On one end of the underframe three malleable-iron broom-bearing brackets were attached, one in the middle and one on each side of the diagonal head block from which the plow formerly hung. In the bearing housings on these brackets coiled springs were placed over the bearings to resist the upward thrust from the cutter spindle which replaced the rotary broom.

The cutter spindle consists of two built-up wood drums, 18 in. in diameter, mounted on the ordinary broom shaft. On the drum surface are numerous cutters or teeth of the form and dimensions given in the scale drawing reproduced herewith. The cutters are of steel, hardened for about one-half their height from the cutting end. On the other end is a tapered hole, ⅝ in. in diameter at the large end, for the reception of a tapered plug. For the purpose of holding the cutters there are three split collars on each drum, two wide ones outside carrying two rings of teeth each, and one in the middle carrying one ring. The outside collars or straps are of ½-in. x 7-in. steel, studded with sixteen teeth each. The inside collars are ¾-in. x 3-in. steel, with six teeth each. The total number of teeth is, therefore, seventy-two. The halves of each split collar are drawn together with two ¾-in. bolts on each side.



TWO VIEWS OF ICE-CUTTING ATTACHMENT FOR SNOWPLOW, SCHENECTADY (N. Y.) RAILWAY

The shanks of the cutters are inserted in the collars and are held loosely in place by means of the tapered plugs. These in turn are locked in position with cotter pins. The wood drums are recessed to accommodate these, thus providing a keying effect of the collars against rotation, supplementing friction.



DIMENSION SKETCH OF STEEL TOOTH FOR ICE CUTTER

Provision is made for raising and lowering the outer spindle by means of chains attached to the bearings and winding upon a shaft driven from a geared handwheel staff. The driving motor is a GE-52 motor on the floor of the cab, geared to a jackshaft mounted in the axle bearings. By means of a chain the jackshaft in turn drives a countershaft under the body, from which chain drives lead to the cutter spindle and to a rotary broom at the rear end.

With the cutter on one end, the broom on the other, and the two wing plows on the side, this outfit is most convenient for work too heavy for a sweeper. It is particularly adapted for service on one-way streets. The wing plows have the usual control, one handwheel raising the heel and one the toe, a third being used to pull the wing out to the desired angle.

The ice-cutter scheme was the joint idea of F. J. Doyle, master mechanic, and W. G. Miller, now with the electric railway at Havana, Cuba.

Some Experiences with Low-Voltage Control

The Author Describes the Methods Necessary in the Maintenance of Low-Voltage Car Equipment to Prevent Trouble

BY O. GOTTSCHALK
Master Mechanic Richmond Light & Railroad Company, New Brighton, N. Y.

TWO of the most essential points in the maintenance of low-voltage control equipment are to have all connections tight and all contact surfaces clean. Experience has shown that 90 per cent of the trouble occurring comes from one of these two causes.

ALL INSULATION MUST BE KEPT CLEAN

Insulators are often located so that they are very difficult to get at for cleaning. In such cases, the best method is to blow the dirt and metallic dust off with compressed air. The insulation is sometimes in a delicate state due to heating, which tends to cause it to become brittle. If too high air pressure is used, the insulation is liable to be destroyed by the force of the blast. My experience has indicated that 40 lb. of air is the best for use, as this has sufficient force for cleaning and involves less danger of damaging the insulation than would a higher pressure. The air used must be free from moisture and vaporized oil, as both of these have an affinity for dirt and metallic dust.

HOW CONTACTS ARE CLEANED

The cleaning of interlocking contacts is best done by using a fine grade of sandpaper (No. 1 preferred). After using the sandpaper, the contacts should be wiped off with a cheap grade of cheesecloth. Waste should never be used for wiping off contacts, as small pieces are liable to become detached and cling to the contacts so as to cause open-circuits or improper contact which will result in burning of the contact surfaces. After the contact surfaces are thoroughly clean, they should be lubricated slightly with a good grade of vaseline. Care should be taken not to apply too much, but just sufficient to lubricate thoroughly, as arcing vaporizes the vaseline and this causes the arc to hold longer than it would otherwise. Dirt and metallic dust will accumulate, but with proper lubrication it will remain in a soft state and the contact surfaces will be kept clean with each wiping action.

In cases where contacts have little or no wiping action, such as interlock contacts and relay contacts, the best results are obtained by making one contact surface of carbon. I have found this an excellent opportunity to use up worn-out motor carbon brushes. It has been found that where metal against metal is used for such contacts a small arc will cause carbonization with sufficient resistance to prevent the flow of the low-voltage current. When one surface is made of carbon the arc disintegrates the carbon only and leaves the metal surface clean. The disintegrated carbon, being of a soft composition, does not remain on the surface of the contact, but is carried away in the form of soot by the heat generated by the arc.

Where carbon contacts are used it is necessary to back them up with a suitable support to avoid excessive breakage. With interlock contacts which have a sliding or wiping action, I have found that the best wear is obtained by using a spring steel finger and a contact plate of cold-rolled copper. Cast brass or copper should never be used for contacts that make and break, as the metal often contains minute blowholes and is of such soft composition that imperfect contact will cause welding. Inspectors should be careful to see that all contact surfaces wear evenly. If uneven wear takes place or if point contact exists, excessive heating will take place and welding will result.

Cylindrical contacts should not be allowed to get out of round as this will result in unequal pressure on the various parts of the contact surfaces and cause welding or arcing.

Other repairs that require attention by the inspectors are the arc deflectors or division plates. These should be cleaned carefully, as any accumulation of dirt or metallic dust will serve as a conductor for the arc and may cause a short-circuit. Careful adjustment of all contact fingers should be made so that the cylinder contacts strike at a point which is about one-third the thickness of the finger metal. Where fingers have excessive vibration, it has been found that this often causes stubbing when rapid opening or breaking of the circuit takes place.

JUMPERS REQUIRE CAREFUL INSPECTION

The service obtained from jumpers depends upon the amount of handling which they receive and also upon the manner in which they are handled. On roads where trains are cut frequently it has been found necessary to replace all jumper cable at least once each year. The greatest percentage of failures occur inside the jumper head and about 1 in. away from the point where the cable enters the jumper. These failures are caused by switchmen using the cable to pull the jumper out of the coupler socket, or by pounding the jumper head when it is not eaily inserted or removed as often occurs in wet or freezing weather. These switchmen are usually not over-careful to strike the metal head only, but strike the insulation as well which causes the damage. Operating men are bound to use the easiest method for their labor at all times, and excessive damage can only be prevented by the mechanical department using such designs of jumpers as will be easy to remove and replace and make certain that they are kept in easy working condition at all times.

Proper inspection should include the cleaning and spreading of all male and female contacts of the jumpers. Any corrosion will prevent or interrupt the flow of current.

In making up jumpers I have found the following to give the best results: Wires attached to the terminals inside the jumper heads should be secured with solder composed of 90 per cent of tin and 10 per cent of lead. This composition gives the greatest strength. A piece of leather or rubber should be placed around the cable inside the head and at a point where the cable passes through to the inside. A rubber bushing installed around the cable at the point immediately outside of the head and under the bell casting will prevent water from entering. For filling in the heads with compound, two small holes should be drilled in the head casting. One of these is for use while pouring in the asphaltum compound after it has been heated to a liquid state and the other permits the hot air to escape and insures a solid compound without cavities. This compound secures the wires firmly and prevents chafing. It also acts as an insulation and protects the wires from moisture. Where possible the compound should be forced in under pressure, as this gives a more even distribution inside the head.

PREVENTING AND LOCATING WRONG CONNECTIONS

With multiple-unit control equipment it often happens that after repairs have been made to jumper sockets the men performing the work neglect to get the wires connected to their proper contact posts and also frequently leave loose or short-circuited connections. The best method for locating wrong connections and insuring that all is in proper condition before the car is allowed to go into service is to make use of a bank of lamps with each lamp representing a given wire in the train line. This bank of lamps should be connected to a test jumper head which is inserted in the coupler socket being tested. The controller is then moved to its various positions and record is made to see that the proper lamps become lighted as each point of the controller is reached.

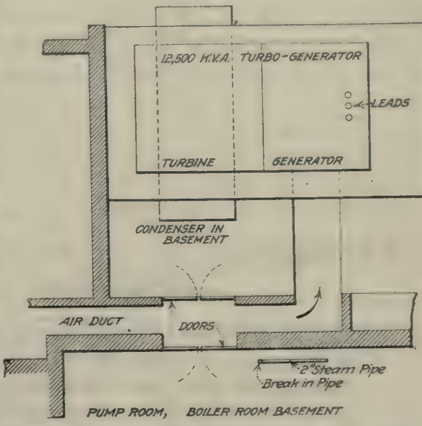
Frequently trouble which cannot be located with the bank-of-lamps test will develop. For such cases I have found what has been termed "shooting the circuits" to be a satisfactory test. This is made by grounding each individual train wire successively and applying 600 volts to the wire under test through a 20-amp. fuse. This test will cause loose connections to become welded or burnt off and the short-circuited or burnt-off connection can then be easily located. All jumpers should be put through a 30-amp. test at least four times a year. Suitable testing apparatus can usually be made in the shop by using lamps or heater coils so arranged as to give the desired value of current and by having suitable switches so connected that a lamp will indicate the wire which is being subjected to the heavy current test. In making this test the jumpers should be in the same position as when they are used between cars, and in addition, they should be moved about and pulled by hand, as this will facilitate locating any weak connections or partly broken wires.

Generating Plants of Large Capacity Save Fuel

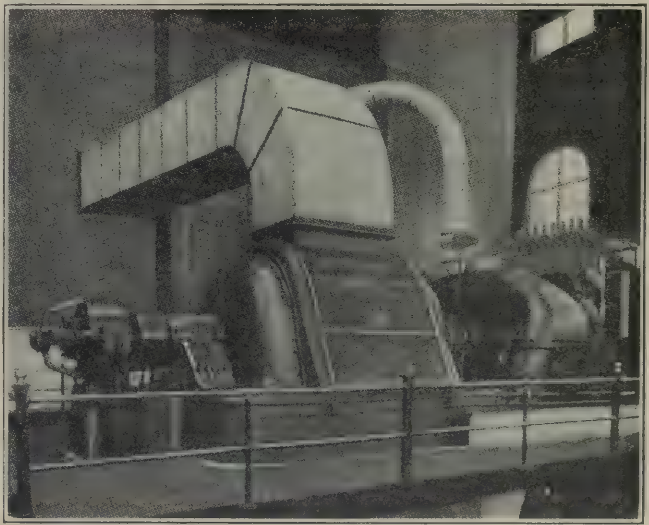
The *Tramway and Railway World*, of London, reports from a German source of information that at least one economist in Germany favors a state power monopoly after the war on grounds of fuel economy as well as on financial grounds. He thinks that all the railways and all industrial and agricultural plants should be electrified and that electricity should be produced in large plants of 100,000 kw. and distributed over high-tension mains at 100,000 volts. He calculates that by electrifying the railways it will be possible to save at least one-third of the coal consumed by them, which amounted to about 20,000,000 tons in the year immediately before the war. He urges that the state should endeavor to reduce home consumption of coal by a third and should reckon to make the most of its profit on coal for export.

Turbine Generator Burn-Out Caused by Steam Leakage

Failure of Union in Steam Pipe Allowed Steam to Be Sucked Into Air Duct Leading to Generator



GENERAL ARRANGEMENT OF APPARATUS INVOLVED IN SHORT CIRCUIT



TURBO-GENERATOR WITH DISCHARGE DUCT IN REEVES AVENUE POWER PLANT, NORFOLK, VA.

SOME months ago the 12,500-kva., three-phase, 60-cycle, 11,000-volt generator, in the Reeves Avenue power house of the Virginia Railway & Power Company at Norfolk, described in the issue of this paper for Dec. 23, 1916, short-circuited when carrying a load of about 6000 kva. The accident had such a serious effect on the local transportation that a notice of it was printed in the issue of this paper for Aug. 24. Inquiry of the company elicited the following details of the accident: Air for the turbine ventilation comes from outside the building through a masonry duct constructed on the turbine room side of the division wall which separates the turbine and boiler rooms. It is discharged through a galvanized duct into the boiler room above the boilers. The main steam header is located along the division wall on the boiler-room side, and the steam connection for the turbine is taken off above the boilers and passes through the division wall direct to the turbine. There is a drop leg near each end of the main steam header which leads to the boiler-room basement with steam trap at the lower end. Steam for the auxiliaries is taken off a short distance above the bottom of the drop leg.

The accident was due to a failure in a 2-in. union in a pipe between the bottom of the drop leg and the steam trap, about 6 ft. from the bulkhead door in the wall of the air duct leading to the generator. This door was necessary for removing condenser tubes. This bulkhead door was built to insurance specifications and was originally a close-fit. A slight inequality in the mason work at the bottom had been produced, however, in removing condenser tubes. Steam from this leak at the union was sucked through the bulkhead door into the air duct and the generator.

The damage to the generator consisted of the burning off of three leads from the terminal blocks. About a foot of 15,000-volt, 1,000,000-circ. mil cable, insulated with varnished cambric and rubber, and flameproof braided, was also melted. The insulation on the end of all coils extending beyond the lamination slots was almost entirely burned off. The heat from the burning insulation fanned by the ventilating air damaged the end shield and the laminations for some distance from the end.

Straightening a Car Axle in Ten Minutes

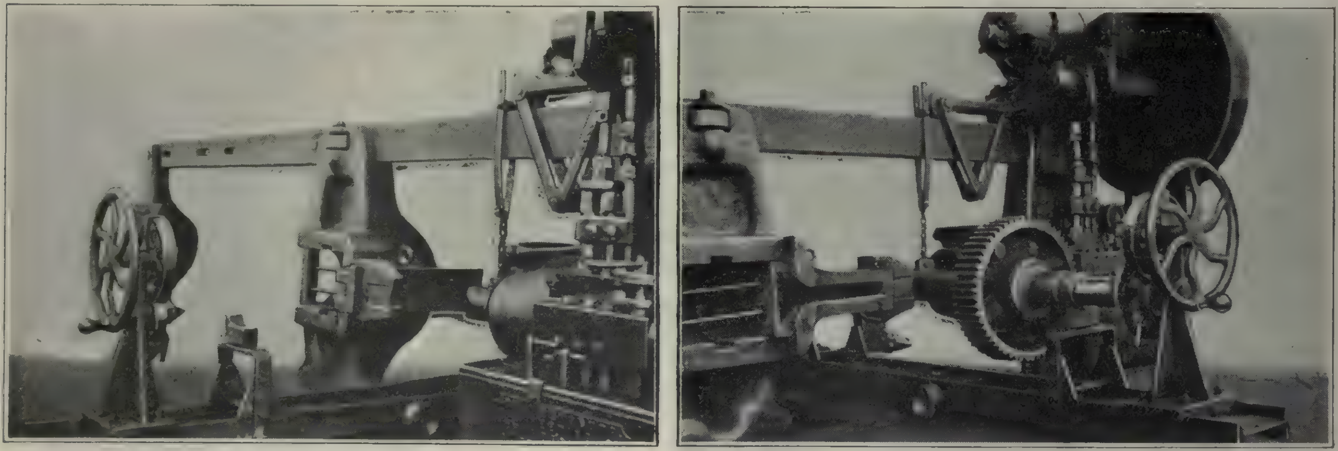
By Utilizing a Wheel Press for Axle Straightening the Cleveland Railway Has Reduced by Nearly 80 per Cent the Time Required for This Operation

BY H. C. EBELING
Engineer, Cleveland (Ohio) Railway.

THIS company has had very good success with an attachment for use in connection with its wheel press by means of which it has been possible greatly to reduce the amount of time necessary for straightening axles. The equipment is shown in the accompanying pictures.

The equipment consists essentially of three parts: a carriage with centers for supporting the axle and provision for rotating it, a base block mounted on the yoke of the wheel press, and an elongation of the plunger of the press through which the force is applied to the axle.

The base block mounted on the yoke is provided with movable pillow blocks arranged to receive the axle, while the plunger extension consists of a short shaft having the end which comes in contact with the axle notched to prevent slipping on the latter.



WHEEL PRESS EQUIPPED FOR STRAIGHTENING AXLES AT HARVARD AVENUE SHOP, CLEVELAND (OHIO) RAILWAY. AT LEFT, VIEW SHOWING THREE ESSENTIAL PARTS OF STRAIGHTENING DEVICE. AT RIGHT, BENT AXLE IN POSITION FOR STRAIGHTENING

The rotating and supporting mechanism consists of two standards, mounted on a 10-in. I-beam lying flatwise. At the tops of the standards are adjustable centers by which the axle is secured. Connected with one center is a small crank which engages with the projection of a lathe dog clamped on the axle. This center is connected through a pair of gears to a hand wheel by means of which the axle is easily and positively rotated.

Two blocks are provided beneath the axle to take the weight when the axle is removed from the centers. These blocks also assist in testing, as they provide surfaces upon which a straight edge can be laid to be used as a support for the operator's hand. The tests for bent portions of the axle are made by touching the high points with a piece of chalk as the axle is rapidly rotated. The operation of straightening an axle consists simply in applying force, at the high points indicated by the chalk marks, which bends it back toward its original shape.

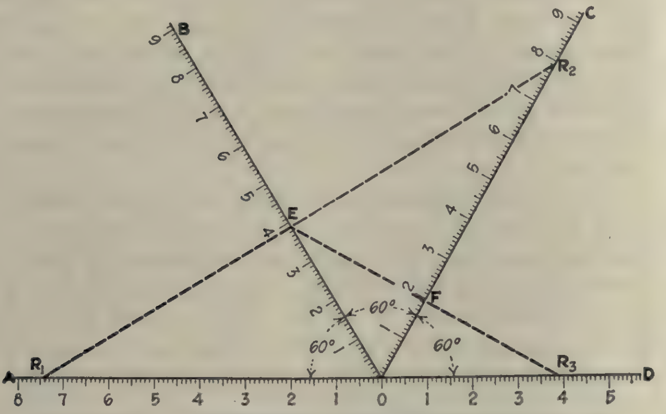
From the description it will be obvious that the operation of testing, pressing, testing again, etc., is a very simple one with this equipment. The operation is kept up, of course, until, in testing, the chalk makes a complete circle around the circumference. In straightening an axle it is not necessary to remove the gear or to remove the axle from the centers when applying pressure.

A casual observer might inquire why a large company like ours does not have a machine designed especially for straightening axles. The fact is that we have such a machine but it is too slow, being fitted with a hand-operated hydraulic ram. When it is used, the axle is supported on pillow blocks near the bend and pressure is applied by means of hydraulic plungers. It takes considerable time and man power to pump up to 5, 10 or 12 tons, and all of this work is lost when the pressure is released and the axle rotated to determine whether or not the bend has been removed. This loss of time and energy is considerable, as an axle must sometimes be tested as many as ten times before it is pronounced straight. With the hydraulic apparatus it required about forty-five minutes to straighten an axle, while now we are able to straighten one in ten minutes, the saving being due in part to the fact that the wheel press is power driven.

Short-Cut for Finding Combined Resistance of Multiple Circuits

Simple and Fairly Accurate Graphical Method for Determining the Value of Several Resistances, Connected in Parallel

WITH certain practical problems, especially those connected with distribution systems, it is frequently necessary to calculate the combined resistance of several circuits connected in parallel. When there are a large number of these circuits, the standard method of calculation becomes somewhat tedious. A considerable amount of this routine work can be eliminated by using the following graphical method.*



GRAPHICAL DETERMINATION OF RESISTANCE OF MULTIPLE CIRCUITS

The method is best illustrated by the solution of a practical problem. Let us find the combined resistance of an overhead trolley system consisting of two trolley wires for two parallel tracks fed from a common feeder. The trolley wires have a resistance of 7½ and 8 ohms respectively and the feeder 4 ohms.

The solution of the problem as indicated in the accompanying diagram consists of drawing four lines with each pair including an angle of 60 deg., along the first line *OA* lay off the resistance of the first trolley wire, 7½ ohms equal to OR_1, then along the third line *OC*, lay off the resistance of the second trolley wire 8 ohms equal to OR_2, draw the line R_1-R_2, this intersects the second line *OB* at *E* and the distance *OE* measured to the same scale as was used in laying off the previous values is 3.9 ohms. This gives the combined resistance of the two trolley wires. Next lay out the resistance of the feeder, 4 ohms along the line *OD* as indicated by the distance OR_3 and draw the line R_3E. This intersects the line *OC* at *F* and the distance *OF* measured to the same scale as the preceding is 1.97 ohms. This is the combined resistance of the three circuits which we are considering. Should there be a fourth resistance in circuit, this is then laid off along the axis *OA* and the operation continued as already described.

Like all graphical methods the accuracy of the result depends to a certain extent upon the scale which is used. This method, however, will be found very convenient for checking results, and where extreme accuracy is not necessary it gives a quick and less tedious method than the usual calculation.

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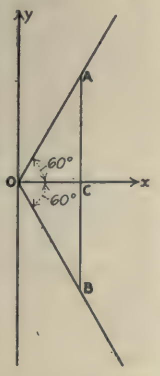
*This graphical method is a short-cut solution of the algebraic equation of parallel circuits. The theory of the method, as given in a recent issue of the *Revue Generale de l'Electricite* is as follows:

Consider axes of rectangular co-ordinates *OX* and *OY* and draw two straight lines passing through the origin *O* and making an angle of 60 deg. with the axis *OX* as shown in the accompanying diagram.



Lay off on these lines two lengths *OA* and *OB* proportional respectively to the resistances R_1 and R_2 of two conductors connected in parallel. The points *A* and *B* determine a straight line *AB* whose equation with respect to the system of co-ordinates is $X\ (R + R_2) - Y(R_1 - R_2) - R_1R_2 = 0$.

The line *AB* cuts the axis *OX* at a point *C*. This intercept may be expressed by the equation

$$x = \frac{R_1 R_2}{R_1 + R_2}$$

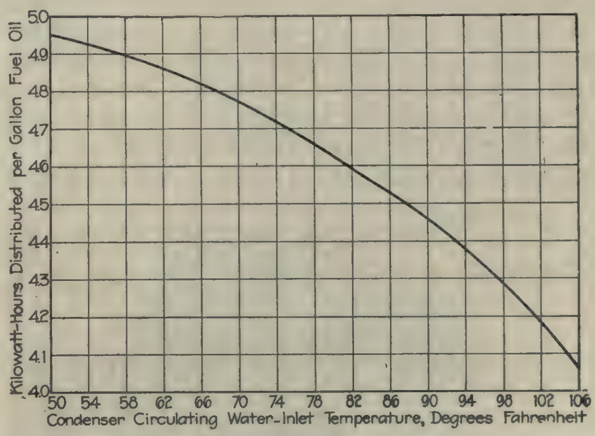
This may also be written

$$\frac{1}{x} = \frac{1}{R_1} + \frac{1}{R_2}$$

This equation is the same as that of the standard formula used for determining the combined resistance of two parallel circuits and shows that the length *OC* is proportional to the resistance of the combined conductors R_1 and R_2 when connected in parallel.

Relation of Intake Water Temperature and Power Plant Efficiency

IN THE ISSUE of this paper for Sept. 21, Hartley LeH. Smith emphasized the importance of the temperature of the intake circulating water in connection with the turbine vacuum and, therefore, the plant efficiency. His point is illustrated by the accompanying "bogie" curve from the Houston Lighting & Power Company, Houston, Tex. This was prepared from the steam curve of the turbine to show the output per unit of force with different intake water temperatures. The percentage by which each day's results are above or below the "bogie" is posted in the turbine room to indicate the actual economies which are being achieved in the station.

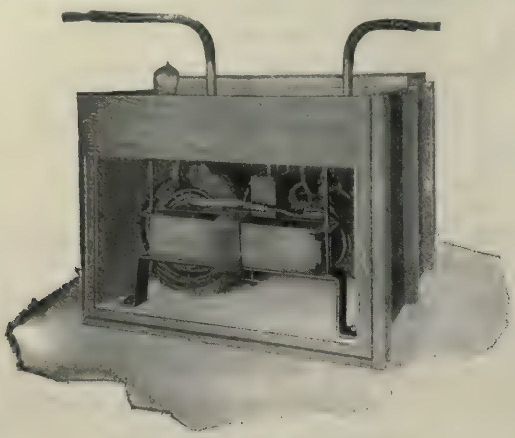


"BOGIE" CURVE OF EFFICIENCY OF POWER PLANT AS INDICATED BY OUTPUT PER UNIT OF FUEL

The New York State Railways, Syracuse lines, is installing an acetylene generator at its Wolf Street shops, for the purpose of supplying gas for cutting and welding. This is being done on account of difficulty in procuring gas, although carbide and oxygen are readily obtainable. A concrete foundation has been placed outside the shop wall to support the generator, which will be covered with a light protecting structure. Heat will be supplied from the hot water system used in the shops. The generator is of the Vulcan "positive pressure feed" type, holding 50 lb. of carbide and producing 56 cu.ft. of gas per hour.

Portable Transformer Used for Electric Arc Welding

A NEW FORM of arc welding equipment for use with alternating current has been placed on the market by the Electric Arc Cutting & Welding Company, Newark, N. J. This consists essentially of an auto-transformer with taps from the various windings brought out and connected to plug contacts. Connections to these are made in a manner similar to the plugging connection of a telephone switchboard. The control of the heat conditions of the arc is made by using a shunt in the magnetic circuit which can be readily moved by an adjustment handle. This feature of heat control maintains a constant power consumption automatically for any given setting. The theory is that constant heat requires constant power, that is, the heat in the arc is the product of both the current and voltage across it.



TRANSFORMER MOUNTING

The following are some of the advantages claimed for this type of machine: (1) Light weight and ease in handling. The largest 60-cycle type weighs 250 lb. and can be handled by two men. (2) No moving parts. (3) Low maintenance cost. (4) High efficiency. The transformer is from 80 per cent to 90 per cent efficient and a pound of mild steel can be deposited by this machine with from 1½ to 2¼ kw.-hr. (5) Machines are designed for use with any alternating-current power supply and for any voltage. (6) Positive heat control, preventing burning of the metal or making of imperfect welds through deficiency in heat. (7) High penetrative qualities for cutting.

PLUG CONTACTS AND ADJUSTMENT HANDLE

Steel Hardening Process Makes Substitute for Manganese Specials

A PROCESS for hardening and carbonizing steel by the direct application of an oxy-acetylene flame is being used with success by electric railways on the Pacific Coast. The most important application of the process made by the United Railroads of San Francisco is its use on special work which has been built up in the shops and which is then substituted for manganese special work. Thus far, crossings so treated are reported as giving service equal to the more costly special steel.

A built-up crossing hardened by this process is said to cost about one-third as much as manganese special work. The oldest crossing on which this treatmen has been used was until recently at Mission and Sixth Streets in San Francisco. It is still in good shape although it has had four years of moderately heavy service.

The process is based on the theory that iron or steel, when brought to a high temperature, will absorb the carbon and other elements necessary to hardening if solutions of salt, sulphate of copper and potassium are applied to the surface in the presence of a hot gas with high carbon content. The tempering is effected while the metal is still hot by chilling it suddenly with water.

The commercial type of oxy-acetylene apparatus is used for heating, and the particular results desired on the metal to be treated are secured by regulating the proportions of acetylene and oxygen supplied to the heating flame. The acetylene gas which carries the highest percentage of carbon has been found to give best results. The proportions of gas in the flame are not important during the initial stages of the heating; in fact, the combination which will produce the hottest flame is generally used. The need for regulation of the flame comes when the metal reaches a high heat and its "pores begin to open" and the affinity for carbon and other elements develops. In this condition the metal has been found to saturate itself with carbon if that element is available. In this "hardening flame" the acetylene gas predominates.

A distinction is made between this process and the common case-hardening methods. The new process is intended actually to alter the chemical composition of the metal treated and the tempering is done as a separate final step in the work. The temper can be made to any degree of hardness, it is claimed, and to any ordinary depth. In the ball of a rail the temper is usually made ⅜ in. deep.

In treating crossings in place it is usually the practice to harden each rail for about 9 in. each side of the crossover. Then where each unit joins rail to rail a length of 6 in. to 9 in. is hardened to insure against breaks at this point. It is claimed that during hardening no expansion can occur in the bolts which might later result in a loosening of the crossing because the high heat is limited to the spot where hardening is desired.

Special work can be treated by this oxy-acetylene method for a cost of about 10 cents per square inch of surface treated. The process has been patented by Nelson H. Bray, San Francisco, Cal.

P. R. T. Acts on Epidemic

Effective Work Against the Influenza Done by the Company by Means of Car Signs and Preventive Measures

WHEN the so-called Spanish influenza, or epidemic influenza as it is now known in this country, made its appearance in Philadelphia late in September, the Philadelphia Rapid Transit Company was one of the first institutions in the city to realize the need for quick action. President T. E. Mitten at once took steps to insure that everything possible be done, not only to prevent the spread of the influenza among the company's employees but in co-operation with the Board of Health, Bureau of Police and Street Cleaning Departments of the city, the most vigorous precautions were taken to protect the traveling public.

Signs were posted in the windows of all the cars, urging the public to prevent the spread of germs by refraining from careless sneezing, coughing or expectorating, avoiding dust and keeping the ventilators open in the cars. The signs attracted favorable comment because of their effectiveness in quieting hysteria and unnecessary fear. A quotation from Doctor William Pepper, Dean of the School of Medicine, University of Pennsylvania reading "Do not get scared to death—many already have been" was used to special advantage in restoring confidence and cool judgment.

Another slogan "Sneeze, cough or expectorate (if you must) in your handkerchief," which has been used in other cities as well, met with quick response on the part of the public.

The company organized a special force of seventy-five men for the purpose of disinfecting all cars at the ends of the lines, with Fer-sul and carbolic acid. Instructions were issued to conductors to keep the car ventilators open and to air the car thoroughly at the lay-over end of the line by opening the doors and end windows of every car.

Motormen and conductors were also cautioned to use their handkerchiefs when necessary to sneeze, cough or expectorate. The need for rigid enforcement of the ordinance prohibiting spitting upon the cars and stations of the company was emphasized and employees were instructed to co-operate with the Police Department to this end.

The company also placed under the direction of the city street cleaning department, six car sprinklers and five wagon sprinklers, which were used continuously night and day for thoroughly flushing streets. These sprinklers also carried large banners reading "Avoid the Dust."

PREVENTIVE METHODS AMONG EMPLOYEES

Among its own employees, the management, by instruction and assistance, left no precaution untried to prevent the spread of the influenza and to relieve those employees afflicted with the disease.

By vigorous follow-up work including the institution of special automobile messenger service between New York and Philadelphia, a supply of a nasal ointment with nasal applicator was obtained in sufficient quantities to distribute one of the nasal applicators and a tube of the compound to each of the 11,000 employees. The ointment known as V. E. M. is a cooling, soothing, mildly antiseptic combination of menthol and eucalyptol (Australian) in a pure hydro-carbon base. No charge was made to the employees for this, and its use was recommended as a preventive.

Flying squads of demonstrators, each consisting of a physician, a nurse and an assistant nurse, were sent out over the entire system, and at each carhouse demonstrations were given as to the method of using the nasal applicator and ointment. These squads at the same time took the opportunity to give talks to the employees on the care of health and the need for cleanliness and general precautionary and preventive measures.

The daily disinfecting of all telephones throughout the company's offices was another one of the preventive measures taken. A circular issue by the Metropolitan

OPEN ALL VENTILATORS
SAYS
DOCTOR PEPPER—U. of P.

AVOID THE DUST
SAYS
DOCTOR PEPPER—U. of P.

To Prevent the Spread of
EPIDEMIC INFLUENZA
sneeze, cough or expectorate (if you must) in your handkerchief. You are in no danger if everyone heeds this warning.
This car is disinfected.
Ventilators must be kept open.
BY ORDER OF **BOARD OF HEALTH**

EPIDEMIC INFLUENZA
DON'T GET SCARED TO DEATH
—MANY ALREADY HAVE BEEN—
AVOID THE DUST—OPEN ALL VENTILATORS—
CLOTHE YOURSELF WARMLY
DON'T SPIT EXCEPT IN YOUR HANDKERCHIEF
CLEAN UP YOUR OWN PREMISES
SAYS
DOCTOR WILLIAM PEPPER
DEAN OF THE SCHOOL OF MEDICINE
UNIVERSITY OF PENNSYLVANIA

SIGNS POSTED IN PHILADELPHIA CARS

Life Insurance Company on what and what not to do when the influenza makes its appearance was distributed to all employees.

The Philadelphia Rapid Transit Company did not lose so many of its employees through sickness as some of the other large institutions in the city and it was able to provide adequate service throughout the epidemic. At the peak of the contagion the largest number out because of sickness was 2100 from a total of about 11,000 employees. Of the 6000 motormen and conductors employed, the highest number reported sick on any one day was 1339.

The company on Sept. 1, 1918, had taken out a blanket policy with the Metropolitan Life Insurance Company insuring in the amount of $1,000 the lives of all employees who became members of the Co-operative Association. Between Sept. 1, and Oct. 15, upwards of forty of these policies became payable because of death. The monthly dues are $1 and none of these deceased employees had paid in more than $2 as premiums. Nevertheless, the sum of $1,000 was paid promptly to the beneficary in each case.

The Health of Women in Railway Service

Woman Specialist in Brooklyn, After Observation of Months, Notes Marked General Improvement In Physical Condition

AN INTERVIEW is published in the October issue of the *B. R. T. Monthly* with Dr. Alice Bowman on the general health of the women conductors employed in Brooklyn. The Monthly explains that Dr. Bowman, who is a woman specialist of long experience, was retained by the company last March to pass upon the physical condition of women applicants for positions in the transportation departments. In connection with this work, and through her association, both professionally and personally, with women in the service, Dr. Bowman has had exceptional opportunities to observe any variations in the health of the women, whether for better or worse, that might occur. She spoke recently with great enthusiasm of the results of her observations. Her remarks, as quoted, follow:

"Speaking generally," she said, "I have observed a remarkable improvement in the spirits of the girls who have entered the transportation service—a marked change for the better in their mental attitude, a broadening in their outlook on life, and perceptible physical improvement in those cases where there was noticeable room for such improvement.

"For women who are strong enough to undertake such work, normally constituted women—and it is the purpose of our examination to eliminate those who are not—the work is not too hard. In the first place, once they have become accustomed to it, the girls really enjoy 'railroading.' There is action to it, motion, change of scene, new faces—the perpetual touch and go of humanity that sustains us all, more or less, and makes life worth the living. These elements compensate for the inevitable irritations that, in common with the men conductors and guards, the girls must encounter, and which are regarded simply as part of the day's work. There is, in short, very little of that monotony which so unfortunately characterizes the average work, whether domestic or industrial, which is performed by the average woman.

"Specifically, my observations have led me to the conclusion that there is nothing in the strictly physical part of the work—the motion or lurching of the cars, the reaching for bell and register cord, the necessity of making their way through crowded cars—that is essentially injurious to the feminine organization. The tensioning of limbs and balancing of body that are called for in moving about in a moving car seemed to have a tendency to strengthen rather than weaken the muscles brought into play, and the open air, enjoyed almost continuously on the surface cars and part of the time on the Rapid Transit lines, brings results in clearer skin and brighter eyes and better lung capacity.

"Three cases that were especially convincing to me were those of girls who were in poor condition, although not sufficiently ill to be rejected on entering the company's service, but who showed really astonishing improvement after anywhere from six weeks to two months on the cars. One of these girls was suffering from anemia, the second from incipient lung trouble, and the third from a bad condition of her skin. All three not only showed great improvement, but all declared that the work on the cars agreed with them better than anything they had ever done before in their lives. All were on the job feeling fit the last time I saw them.

"Another girl I know who liked the work—a typical case, I think—gave it up because of some criticism on the part of her friends, and returned to a factory where she had been working before. It was not long, however, before she was back asking for reinstatement. She declared that the factory work seemed unbearable after 'railroading,' and that she had not felt nearly so well. From then on, as she expressed it, the cars were good enough for her. Incidentally, her husband was in France, and she was supporting her little boy, four years old, and living with her parents. By working extra when she felt like it, she was making regularly from $18 to $24 a week."

Electrolysis of Condenser Tubes

A RECENT issue of London *Engineering* contains the results of an analysis of two cases of condenser tube corrosion made by the Material Prüfungsamt near Berlin, Germany. One brass originally contained the following percentages of metals: Copper, 70.5; zinc, 28.8; lead, 0.21; tin, 0.28; iron, 0.08. The corroded alloy contained: Copper, 97.4; zinc, 0.69; lead, 0.06; tin, 0.46; iron, 0.08. In the other case the original analysis yielded the following percentages: Copper, 59.2; zinc, 40.37; no tin; iron, 0.32; lead, 0.24. The corroded alloy had the composition: Copper, 97.76; zinc, 1.29; no tin; iron, 0.10; lead, 0.05.

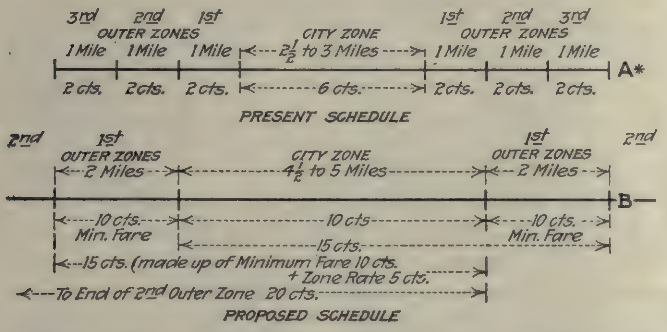
In both cases the corrosion had bleached out the zinc and had also diminished the small percentage of lead, while there was little or no change in the iron. That the ordinary water of the supply main may give rise to considerable differences of electric potential is shown by the water of Charlottenburg, a suburb of Berlin. In this water couples of zinc and brass acquire a potential difference of 0.888 volt. In view of the actual wide uses of substitutes for metals and alloys the Prussian government has drawn attention to the danger of electrolysis.

Bay State Asks 10-Cent City Fare

Suburban Lines Divided Into Zones of Two Miles With Fare of 5-Cent and 10-Cent Minimum—Reduced Rate Tickets to Be Abolished

ON OCT. 11 the Bay State Street Railway of Boston asked for an increase in fares with abolition of all reduced-rate tickets including those sold for off-peak hours. The petition requested authority to put the new fares in operation on Nov. 11. Presumably the Public Service Commission will grant hearings to consider the petition and to hear any opposition.

Briefly, the proposed plan divides the cities into "city zones," approximately 4½ to 5 miles in diameter, in which the fare will be 10 cents, and the interurban lines into 2-mile zones, in which the fare will be 5 cents a zone with a 10-cent minimum fare. The fare schedule, which was adopted June 24, has much smaller city zones, averaging perhaps 2½ to 3 miles in diameter with a 6-cent cash fare, and outer zones of about 1 mile in length with fares at the rate of 2 cents per mile. The accompanying diagram shows the general plan.



CASH FARES, PRESENT AND PROPOSED SCHEDULES ON BAY STATE RAILWAY

The upper diagram shows present cash fares, but certain reduced-rate tickets are sold. The lower diagram shows the proposed schedule of fares. Under this schedule all reduced-rate tickets, except school tickets, are eliminated.

Note: On some of the lines in the present schedule the outer zone rates are 2½ cents and 3 cents per mile.

The proposed schedule also calls for the abolition on all reduced rate tickets with the exception of those sold to school children. The company believes that the use of the nickel and its multiple, the dime, will prove of great advantage from the point of view of simplifying the collection, handling and accounting of its revenue.

In increasing the so-called city zones these zones have in general been increased by taking in the first zone on each side of the former urban zone limit. Beyond the new urban zone limit the zones have practically been doubled in length in comparison with the previous zones. Within the city zones, universal transfers will be given.

The principal reduced-rate tickets which will be eliminated are: All-day city tickets, six for 30 cents; mid-day or off-peak city tickets, six for 25 cents; all-day suburban tickets, seven for 50 cents (good from the city zone to the limit of the first outer zone); mid-day or off-peak suburban tickets, four for 25 cents (good from the city zone to the limit of the first outer zone).

All four of these present reduced-rate tickets are good only to the traffic center.

The company's experience has been that the reduced-rate tickets have not built up traffic, and the city fares were not on the average increased appreciably by their use. The company's present schedule has generally been criticised as being too complicated. The revenue has been unsatisfactory, and it is hoped by the adoption of the proposed schedule greatly to improve the situation.

Where the Bay State lines are in competition with the Boston Elevated Railway, as in Chelsea and Hyde Park, the city zone fare unit is to be established at 7 cents, as in Boston.

The explanation of the plan given to the press by Receiver Wallace B. Donham follows:

STATEMENT OF RECEIVER DONHAM

The Bay State Street Railway Company must have a large increase in revenue immediately, and I am filing a new fare schedule to-day. It has been my intention not to file with the Public Service Commission another tariff revising the fares but to leave this problem to the trustees who are appointed by the Governor to manage the property under the legislation passed last winter. This however turned out to be impossible for several reasons.

In the first place, financial conditions arising out of the war have made it so difficult to raise money, particularly for street railways, that it has not yet been possible to accomplish a reorganization of the property under the public control act. Such a reorganization necessitates raising several millions of dollars. Trustees could not therefore take over the management of the property, and the receivership could not be brought to an end.

In the meantime, the labor situation has developed in such a way as to bring about a crisis, requiring an immediate readjustment of revenue. The Bay State Street Railway employees are to-day getting less compensation than the employees on street railways such as the Springfield Street Railway, Worcester Consolidated and Middlesex & Boston, and very much less than the employees of the Boston Elevated.

It is impossible that this situation should continue long, and I, as receiver, have no funds with which to pay higher wages. If wages are not raised the property cannot continuously be operated because it will be impossible to get men to operate the cars. If wages were raised without an increase in revenue, the property could not be operated because the United States Court which appointed the receiver would not allow me to borrow money for the purpose of paying operating expenses.

Nothing else therefore is possible but an increase in fares and in order to accomplish the result, this increase in fares must be substantial.

The schedule under which the company has been operating this summer has not proved satisfactory to the public or to the employees of the road, and has generally been criticized because it is too complicated. The reduced rate city tickets have not built up traffic and the city fares were not therefore on the average increased appreciably. The city revenue has therefore been unsatisfactory.

The revised schedule filed to-day is drawn with a view to eliminating all possible complications and getting the system on a simple, readily understood and workable system of fares. The city areas are made larger than the city areas in the tariff operated this summer and the country zones are made approximately two miles in length instead of one mile in length. The whole system is then put upon a uniform basis of fares with a 10-cent minimum fare, good in the cities with universal transfers and in the outlying districts good for two zones or any part of two zones with additional fares of 5 cents a zone for rides extending outside the cities or more than two zones in the country. In general, reduced rate city, suburban and workingmen's tickets are abolished.

The present Hyde Park city zone is left as it now exists and the unit fare is made 7 cents because of its proximity to the elevated system. Similarly in the Chelsea system to Scollay Square which is within the limits of the Boston elevated territory, the fare will be by later tariff placed on the same basis as the elevated fare.

Increases in the rates of electric railway fare are not confined to the United States. In Japan the Imperial Government Railway recently made a decided advance which is expected to have a widespread influence in the movement for higher fares throughout the empire.

AMERICAN ASSOCIATION NEWS

War Board Recommends Two Types of Cars to Housing Bureau

IN RESPONSE to the Aug. 19 invitation of Otto M. Eidlitz, director of the United States Bureau of Industrial Housing and Transportation, that the War Board of the American Electric Railway Association suggest a car suitable for use under average city conditions on standard gage track, the majority of the committee appointed for that purpose has recommended two types, "A" and "B," for its consideration.

Type "A" is arranged for both prepayment and side-door pay-as-you-leave operation, with one or two operators on the car. It is 47 ft. 9 in. over all. Type "B" car, which is 47 ft. long, has doors at all corners and is arranged for either one-man or two-man operation. Both cars are designed for train service if desired. The specifications were drawn up by C. O. Birney in co-operation with car builders, electrical manufacturers and others.

As some of the members of the committee felt that wider doors and drop platforms would be more desirable for heavy service conditions, it was moved to appoint a new sub-committee with H. H. Adams as chairman to prepare comparative plans and specifications. The details of membership of this committee were left to the discretion of E. C. Faber, manager of the War Board.

A resolution of appreciation and thanks, proposed by J. H. Hanna, was voted C. O. Birney and his aides for their thorough work in so short a period. A similar motion was proposed by Mr. Faber and carried at the meeting of the sub-committee (Messrs. Lambert, Layng, Birney, Seely and Wells) on Monday, Oct. 14.

The committee members present at the meeting were E. C. Faber, J. H. Hanna, John Lindall, H. H. Adams, M. B. Lambert, J. F. Layng, C. O. Birney and Gardner F. Wells, the latter representing the Bureau of Housing and Transportation. There were also present as guests of the committee J. C. Thirlwall and Walter Jackson.

Pamphlet Gives Testimony on Utility Taxation

THE national committee on public utility conditions, with which the American Electric Railway War Board is associated, has published in pamphlet form a transcript of the testimony given on Sept. 14 by Philip H. Gadsden, chairman of the committee, before the committee on finance, United States Senate, on the war revenue bill. Mr. Gadsden's testimony was a plea for the reduction of the tax of 12 per cent and 18 per cent on net earnings. During this testimony Mr. Gadsden pointed out that the War Finance Corporation in several cases had required companies to discontinue paying dividends when it loaned the money to them, whereas the bill required the companies to pay 6 per cent more on earnings which are not paid out in the form of dividends. In other words, the railways were penalized by the taxing authorities for doing what they were instructed to do by the War Finance Corporation.

LETTER TO THE EDITORS

Further Objections to Proposed Daylight Saving Extension

NEW YORK DAYLIGHT SAVING COMMITTEE
NEW YORK, Oct. 14, 1918.

To the Editors:

In addition to the arguments against the proposed winter extension of daylight saving quoted in the admirable editorial in your issue of Sept 21, there are the following objections:

1. We have no precedent of successful experience of other countries to base an action which, on the very face of it, seems ridiculous, namely to try to save daylight *before* daylight in winter short days.
2. It would throw our time out of uniformity with European time.
3. It would arouse such opposition as would result in killing the summer movement which has been so beneficial.

MARCUS M. MARKS,
President National and New York Daylight Saving Associations.

Canadian Association Elects Officers

THE Canadian Electric Railway Association met at Toronto, Ontario, on Sept. 17 and 18, with the president, C. L. Wilson, assistant manager Toronto & York Radial Railway, in the chair. On account of war conditions, the usual practice of having papers read and discussed was omitted, and the greater part of the time was devoted to the reading and discussion of the honorary secretary's report on the association's work for the past year, and the discussion of other matters vitally affecting all electric railway companies, such as the necessity for securing increased revenues, etc.

The following were unanimously elected as officers: President, A. Eastman, vice-president and general manager Windsor, Essex & Lake Shore Rapid Railway; vice-president, A. Gaboury, superintendent Montreal Tramways; honorary secretary-treasurer, Acton Burrows, managing director *Canadian Railway & Marine World;* executive committee: E. P. Coleman, general manager Dominion Power & Transmission Company; James D. Fraser, director and secretary-treasurer Ottawa Electric Railway; G. Gordon Gale, vice-president and general manager Hull Electric Company; H. M. Hopper, general manager New Brunswick Power Company; George Kidd, general manager British Columbia Electric Railway; M. W. Kirkwood, general manager Grand River Railway; J. S. Mackenzie, treasurer Winnipeg Electric Railway; R. M. Reade, superintendent city and Quebec County divisions, Quebec Railway, Light & Power Company; C. L. Wilson, assistant manager Toronto & York Radial Railway; assistant secretary, A. A. Burrows, business manager *Canadian Railway & Marine World.*

The American Society of Mechanical Engineers has issued a roll of honor of members in national service. Of the 9141 members of the society 933, or more than 10 per cent, have responded to the country's call.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

No One-Man Makeshifts

Massachusetts Commission Insists that One-Man Cars Must Contain Safety Features

In a decision dated Oct. 10 the Public Service Commission of Massachusetts dismissed a petition of the Connecticut Valley Street Railway for approval of type and use of one-man cars upon its Millers Falls division in the town of Montague and upon its Conway Street line in the town of Greenfield.

WANTED TO USE OLD CARS

The company desired to operate the cars now in use on the Millers Falls division with one man without remodeling, merely closing the rear doors and requiring passengers to enter and leave by the front end. The company maintained that it does not feel that it ought to go to the expense of furnishing new cars for this division under existing conditions. It was a part of the company's plan to provide two men on the morning trip and the late afternoon trip, on which workmen are taken to Millers Falls, and vice versa at night, by utilizing as a spare conductor one of the passengers who is an ex-employee of the railway.

The commission is of the opinion that the use of old and inappropriate equipment for one-man service on such lines is apt to prove disappointing to both patrons and company. The chief question in the case is that of safety of operation, as the traffic is light except when the company plans to provide two men. The operating conditions on a portion of the route, at the Turners Falls end, are unfavorable, in the commission's view, on account of the presence of a long and comparatively steep grade with a 90-deg. turn about 600 ft. from the bottom. The decision says, in closing:

WOULD ENCOURAGE ONE-MAN CARS

"The commission is fully aware of the financial straits in which many railways now find themselves, under war-time prices and wages. It is our belief that one-man operation ought to be encouraged, and the commission is ready to approve the use by the petitioner upon its Millers Falls division of new one-man cars of modern design, or of old cars properly reconstructed for such use. It is possible, indeed, that all the special devices above described (the usual complete safety and automatic features of the safety car) would not be necessary, and any plans for simplified reconstruction which the company may desire to submit will be received and reviewed without prejudice.

"It is our information that reasonably prompt deliveries can be expected, either of new equipment or of apparatus necessary for reconstruction purposes. After careful consideration, however, the commission is not willing to approve the mere elimination of the conductor, without any adaptation of the existing cars for one-man operation. We reach this conclusion not only because of the recently demonstrated danger of operation upon the line in question, but because of a belief that it would not be a desirable precedent to set.

"The companies in other parts of the country which have derived financial advantage from one-man operation have gained not only from the saving of labor, but also, and in perhaps greater degree, from the improvement of service which it has made possible. There may be lines where the makeshift arrangement proposed by the petitioner may reasonably be permitted, but in the great majority of cases it would, in our judgment, be inconsistent with both the public and the company's interest. The petition is dismissed."

Interurban Strike Settled

The strike of platform men employed on the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., on its interurban lines between Erie, Pa., and Buffalo, declared at 4 a.m. on Oct. 3, was called off two days later when George E. Bullock, receiver for the company, agreed to submit the wage question to the War Labor Board for a decision. The men had been receiving 40 cents an hour. They demand an increase of 8 cents an hour. An offer of 45 cents an hour made by Mr. Bullock was rejected.

Although the strike was called off by the trainmen on Oct. 5, the company was unable at once to operate cars from the Buffalo city line to its Main Street terminal, a distance of almost 5 miles, because of the strike in the power houses of the International Railway, Buffalo, which supplies the company with power. This situation has been remedied and now the company is operating cars along its entire route. For a short time after the strike was settled, no cars were operated between Buffalo and Dunkirk because Receiver Bullock said the traffic did not warrant the service. The Buffalo & Lake Erie Traction Company is now the only interurban line entering Buffalo. No cars of the Buffalo, Lockport & Rochester line operate over the International lines between the Lockport city line and the Buffalo interurban terminal. Buffalo, Lockport & Rochester cars stop at the Lockport city line.

War Labor Board on Rates

Indicates That Where Labor Opposes Fare Advances It Will Nullify Wage Awards

Plain indication was given on Oct. 8 by the National War Labor Board that in cases where organized labor opposes advanced electric railway fares recommended by the board in connection with increased wages awarded to employees of public utility companies, the entire award will be suspended.

THE BOARD'S LETTER

In this connection the board made public a letter to John R. Alpine, acting president of the American Federation of Labor, calling his attention to the fact that labor organizations in New Orleans were planning to oppose increased fares recommended by the board when it granted an increase to the railway employees there. The letter of Messrs. Taft and Walsh, joint chairmen of the board, follows:

"We are advised that an organized labor meeting is to be called in New Orleans to protest against a recommendation made by us as arbitrators in the issue made by complaint of street railway employees of the Amalgamated Association against the New Orleans Railway & Light Company.

"In that case we made a very substantial increase in the wages of platform men, equal to approximately 70 per cent, and in order that the company might have the money with which to meet this very great increase in its operating expenses we recommended to the local municipal authorities that there be made an adequate increase in the rates of fare. This matter was brought to the attention of the Municipal Council on the application of the railway and in the face of our award was resisted by the president of the Local Amalgamated Association and by other representatives of the local organizations affiliated with the American Federation of Labor.

MAY SUSPEND AWARD

"We are advised that on Sunday, Oct. 6, a meeting of organized labor is to be called to protest against compliance with our recommendations as to the increase in fare. If this action is taken by the labor organizations it would seem that in justice we shall be compelled to suspend the entire award, including the increase in wages, pending a rehearing of this matter which we now have under advisement.

"We trust that you will take whatever action you may be advised will fit the situation."

The rate matter is referred to on page 717 of this issue.

Boston Accepts Wage Award

Trustees Recognize Ineffectiveness of Increase in Unit Fare and Start Zone Fare Studies—Messrs. Richey and Witt Retained

The board of trustees of the Boston (Mass.) Elevated Railway at a regular meeting on Oct. 8 accepted the award of Messrs. Taft and Walsh on the application of the employees for increased wages. It is understood that the local carmen's union has also accepted the award.

WAGE INCREASE $3,000,000 A YEAR

Officials of the company estimate that the increase in the rate of wages granted by this action of the War Labor Board will be in the neighborhood of $3,000,000 per annum. With the adjustments in the wages of other classes of employees which are bound to follow, and which are in principle accepted by the board of trustees, the total increase is likely to exceed the sum named.

Now that the award of wages has been made, and as soon as the application of the same can be figured out, it will be the policy of the board of trustees to make regular monthly publications, beginning as soon as possible with the figures for July, August and September, of all receipts and expenses incident to the operation of the property. In this connection Stanley R. Miller, of the trustees for the public operation of the railway, has made the following statement:

"It is obvious that with the disappointing increase in revenue which has followed the increase in the fare unit, the showing for the first quarter will be very poor. In particular, the statement for the month of July is certain to be almost disastrously bad, because in that month were some unusual expenses while the fare increase did not become effective until Aug. 1.

"The trustees are confronted with an extremely difficult and serious problem. They are required by law to establish rates of fare sufficient to meet the cost of providing service. When they assumed office it was very evident that a crisis was at hand and quick action was imperative. Acting on the best advice then obtainable, the fare unit was increased from 5 cents to 7 cents, the increase taking effect on Aug. 1. The effect of that increase upon the actual revenue received has already indicated the necessity of some further very radical action in the matter either of the rate of fare or the entire basis of fares. It is obvious that there must be a very large increase in the company's revenue.

TOTAL NEW EXPENSES $7,500,000

"Speaking roughly, the trustees are confronted with new expenses and financial requirements chargeable against the cost of operation, expressly required by the statute, amounting to $7,500,000. This sum is made up of the $3,000,000 wage increase, an item of additional depreciation of substantially $1,600,000, an additional rental charge on account of the Dorchester subway of $400,000, increased cost of coal $500,000, interest and dividend charges upon recent issues of bonds and the new preferred stock of the Boston Elevated Railway of $300,000, 5 per cent dividend upon the common stock of the Boston Elevated Railway of about $1,200,000.

"The increase in the fare unit from 5 cents to 7 cents on Aug. 1 was followed by an increase in revenue of $368,000 for the month of August, which was 23.79 per cent more than the revenue in August, 1917.

"In September the revenue increase was $186,000, or 12.15 per cent. For the first ten days of October there has been an actual decrease in revenue as compared with the same period of 1917. It should be pointed out that the low rate of revenue increase in September and the actual decrease suffered in October have undoubtedly been due in a considerable measure to the epidemic of influenza recently prevalent.

"The trustees have no option under the law but to establish rates of fare of some kind that will, in their judgment, meet the cost of service. Any deficit which results if such cost of service is not covered is in the first instance reimbursed to the company by the Commonwealth, and later pro-rated by the Commonwealth on the cities and towns served by the elevated. The question, therefore, is a very intimate one for every taxpayer of the Metropolitan District.

Surface lines, motormen and conductors:	Award of War Labor Board	1918 Wage Scale by 1916 Agreement, Established Scale	Total, Incl. War Compensation of 2 Cents per Hour
First three months' service	43	30.25	32.25
Next nine months' service	46	30.5	32.5
Thereafter	48	31.75–35.5	33.75–37.5
Rapid transit lines, motormen:			
First three months' service	45	33.75	35.75
Next nine months' service	48	33.75	35.75
Thereafter	50	34.5–37.5	36.5–39.5
Rapid transit lines, guards:			
First three months' service	43	29	31
Next nine months' service	43.75	29	31
Thereafter	44.5	30.5–32.00	32.5–34.00
Rapid transit lines, brakemen:			
First three months' service	40	25.5	27.5
Next nine months' service	41	25.5	27.5
Thereafter	42.5	26.75–28.25	28.25–30.25

"Recognizing the evident ineffectiveness of the mere increase in the fare unit, the trustees have inaugurated searching investigations as to various possible other means of fare collections. It is in the mind of everybody that the zone system of fare charges should be carefully considered in its possible application to the Boston situation. Professor Richey has already been giving considerable time to this question, and Peter Witt, Cleveland, Ohio, will come to Boston to make an exhaustive study and recommendations."

The wage rates just referred to are fixed for the period of the war only. The Boston five-year graduated scale is cut down to a graduated scale covering the first three months, next nine months and thereafter. The wage scales in cents per hour are compared in the accompanying table.

In the 1916 agreement column, the established scale after the first year ranged between the rates shown, extending from the second to the fifth year inclusive, subsequent rates being those of the fifth year. The War Labor Board's award wipes out four of the five years of the sliding scale agreed upon between the company and the union, and scheduled to run from 1916-1919. The wages in the 1916 column are those the company was paying in 1918. By that agreement there were progressive increases from year to year. The actual rates paid in 1916 are not shown, the comparison being merely between the 1918 rates and the award of the War Labor Board. The war compensation added to the rates in the second column, 2 cents an hour, was awarded by Henry B. Endicott in 1918 in a special arbitration between the company and the union. This flat increase when added to the second column gives the actual rates the employees tabulated were receiving prior to the War Labor Board's award.

The wages of employees other than those fixed above were increased by 28 per cent, in the board's award, and in any case where this percentage increase did not bring the wage up to a minimum of 42½ cents an hour, that minimum was established by the War Labor Board in the case of all adult male employees and of women employed in the same classification as men, the women receiving equal pay for equal work. Two instances of the striking increase of pay granted to miscellaneous employees follow: Porters received 22½ cents an hour, and now receive 42½; car cleaners received 26 cents an hour, and now receive 42½. This is a weekly increase of $14 for porters and of $10.23 for cleaners.

Another important recommendation of the board was that for the duration of the war the agreement as to schedule runs on both the surface and the rapid transit lines be modified so that 55 per cent instead of 70 per cent of the schedule runs are to be laid out with outside time not to exceed eleven hours. The award is dated Oct. 2, 1918, and takes effect as of June 15, 1918, continuing for the duration of the war with a provision for reopening by either party at six months' intervals, beginning on April 1, 1919.

St. Louis Franchise Settlement Rejected

New Ordinance Not Sufficiently Flexible, Says Company President, Who Sees Breakdown of Commission Regulation

The franchise settlement ordinance of April 10 has been rejected by the United Railways, St. Louis, Mo. This was made known by the company through a letter addressed on Oct. 8 by President Richard McCulloch of the company to Mayor Kiel. The reasons for rejection as summarized by President McCulloch are as follows:

CONDITIONS HAVE CHANGED

1. Fundamental conditions have so changed that the company confesses its inability to give St. Louis and contiguous territory adequate transportation facilities under the ordinance of April 10.
2. The growth of government ownership since the war began indicates that every facility for the public operation or ownership of these railways should be provided in any settlement ordinance; the present ordinance is not sufficiently flexible in these respects.
3. Street railway service should be sold at cost. Lowest cost will result from a public guarantee of integrity of investment and interest thereon; the present ordinance does not permit this result.
4. An equitable adjustment of the company's capitalization cannot be made under this ordinance.

The ordinance known as the "compromise ordinance," affecting the relations of the city of St. Louis and the United Railways, after being passed by the Board of Aldermen, was signed by the Mayor on April 10. The conference and hearings on the ordinance were begun in 1916, and have been reviewed in the ELECTRIC RAILWAY JOURNAL. In his letter to the Mayor President McCulloch said in part:

"This country had not at that time (the start of negotiations) entered into the world war. Regulation of street railway rates by commissions was then thought practicable and sufficiently responsive to moderate changes in expenses and cost of service to meet all reasonable requirements. Public ownership appeared many years off and an issue to conjure with rather than to consider seriously.

CONCESSIONS BURDENSOME

"In the progress of the settlement conferences, representatives of the railway conceded many matters which they believed at the time to be of importance. We felt that we were justified in traveling far along the road required to meet your views and those of your associates in the administration to the end that harmony might finally result.

"While the ordinance was in the Board of Aldermen fundamental conditions began to show changes visible even to the layman. Prices of all commodities showed a heavy upward trend. With the rise of commodities there came increases in cost of living. Fairness to labor required that wages be largely increased. With the general rise in commodity prices and wage level, there came the increased cost of capital. Interest rates have gone so high that little capital for the extension of our railway system could be obtained on the basis contemplated as fair at the time that the ordinance was first discussed. In the light of present conditions and those likely to obtain during the war readjustment period, it now appears that we would have misled not only ourselves but also your administration and the public with respect to improved street railway facilities in St. Louis and contiguous territory. The ordinance of April 10 could not have accomplished its expected purpose.

COMMISSION REGULATION HAS FAILED

"In Massachusetts, where regulation of street railways has been practiced the longest, it has been determined that commission regulation failed. It cannot meet the crisis of rapidly changing conditions. It has proved satisfactory neither to the public nor to the investors. It failed to provide the facilities to which the public believed they were entitled. It failed to give to the investors that certainty of return which they were led to believe was rightfully theirs because of the State supervision of issue of securities and the limitation of profits to mere legal interest rates.

"The operation of the steam railroads and the lines of wire communication by the federal government has been made necessary by the war. There, too, in the case of the railroads regulation by commission failed to carry them over the crisis. There are many thoughtful people who see the necessity of public ownership of municipal and intercity public utilities. The public will decide this question and decide it right. But the franchise of April 10, 1918, did not make it easy or convenient for the public to assume the operation either with or without public ownership of the railways. In this respect, the ordinance was defective judged from present-day standards and would likely have been found to be unsatisfactory both to the public and to the company.

"Public utilities have suffered large losses in earnings since the war began. Variation in earning power makes an industry hazardous from the investors' viewpoint. Certainty of return makes an industry stable. Low interest rates are associated with stable earnings, and high interest rates with hazardous industries. Where the nation, state or municipality, guarantees the return, capital can be cheaply obtained. The best present-day thought is that the making of such guarantees in respect of public utilities is a proper function of government.

"If, for the time the public wishes the street railways in St. Louis and contiguous territory to be privately owned and operated under a service-at-cost plan, then any street railway settlement ordinance should provide for making the cost a minimum. This can be done only by arranging for the public guarantee of operating expenses, taxes, allowances for future replacements and a return upon the money fairly invested in the enterprise. On no other basis could the public expect good service. And on no other basis would the company be justified in entering into new arrangements which involved an undertaking to expand the present facilities. The financial structure of the company cannot be permanently adjusted under the ordinance of April 10.

A MODERN SETTLEMENT NECESSARY

"For these reasons, the United Railways respectfully advises you that the ordinance of April 10 cannot be accepted by the company, and is hereby declined.

"We think that we are cognizant of the transportation requirements of the city of St. Louis and contiguous territory. We know that the present disturbed conditions are satisfactory neither to the public nor to the investors who have provided such facilities as you now enjoy. The best interests of a Greater St. Louis require that a modern settlement be reached involving conditions that will be readily approved by the public. We stand ready to discuss the subject and continue the discussion until a fair arrangement has been concluded."

Status of St. Louis Wage Question

The United Railways, St. Louis, Mo., has refused to accede to a proposal made by the local union that the wage scale now in existence be abrogated and that hearing be held before the War Labor Board to determine if the men are entitled to an increase in salary. The present wage scale of the company was agreed upon by both sides June 1, when, at a conference of the company officials and the officials of the newly formed union, the strike was formally settled. More than a month ago the employees through their union asked that the wage question be left to the War Labor Board. This request was rejected. Following this refusal the employees appealed to the War Labor Board in a letter from A. O. Piant, president of the union. The secretary of the War Labor Board then mailed a copy of this letter to the United Railways and asked if the company would submit to the conference suggested. The reply of the company, while it does not refuse to arrange a conference, sets forth the reasons why the company cannot entertain a proposition dealing with any increase in salary. It suggests that the employees make their request to the Public Service Commission at the time that the petition of the company for another increase in fares is heard.

Buffalo Strike Unsettled

Company Making Effort to Operate, But Mayor Seems Determined to Force Receivership

Three plans are being advanced to end the strike of employees of the International Railway, Buffalo, N. Y., and thus bring about a complete resumption of service in Buffalo, Niagara Falls and Lockport and on the Olcott division of the International lines. They are all suggested by members of the City Council. Two have the approval of the International Railway while one is being opposed by the company.

The plan opposed by the company is that being carried out by the Mayor and one member of the City Council. Justice Louis B. Marcus of the Supreme Court of Erie County issued a writ of mandamus directing the company to start the operation of cars on all of its lines at noon on Oct. 10. The judge said that failure to operate cars would force him to apply to the United States Court for the Western District of New York for the appointment of a receiver to operate the line. An appeal was taken to the Appellate Division of the Supreme Court at Rochester and a stay was granted. The Appellate Division affirmed the decision of Justice Marcus and a further appeal has been taken by the company to the New York State Court of Appeals. Arguments were set to be heard in Albany on Oct. 18. If the Court of Appeals affirms the judgment of the lower court, the case may be carried to the United States Supreme Court.

Despite the efforts of every daily newspaper, the Chamber of Commerce, the Retail Merchants' Association and other commercial organizations to have the Council enact an emergency ordinance which would end the strike at once, the Mayor says he will hold out indefinitely.

The two plans for a settlement which have the approval of three members of the City Council and officials of the railway provide for partial reorganization of the company and a 6-cent fare. The first plan provides for the enactment by the City Council of an emergency resolution allowing the company to collect a 6-cent fare from passengers pending an investigation into what should be a reasonable rate of fare by the Public Service Commission of the Second District and the giving of rebate slips for 1-cent to all passengers who pay the 6-cent fare. These rebate slips would allow passengers to get a rebate of 1 cent if the State Public Service Board holds that a 5-cent fare is just and equitable.

This plan also provides for the appointment of additional members to the board of directors of the company by the City Council. Under this plan, which has the approval of E. G. Connette, president of the International Railway, and the directors, the strikers would receive the wage award of the War Labor Board and they would also be guaranteed by the company the back pay to June 1, computed on the basis of the award of the War Labor Board. Approval of this plan by the Council would not be subject to a referendum of the voters at a special or general election in the same manner as the first 6-cent fare resolution enacted by the Council and later rejected by the voters.

The second plan, which also has the approval of the company and is favored by three members of the City Council, likewise provides for an emergency 6-cent fare ordinance with a 1-cent rebate slip, but other provisions differ from the first plan. This plan provides for a board of three to operate the road, each to receive a salary of $1,000 a month. One of these commissioners would be named by the city; the second by a Supreme Court justice and the third by the railway. This plan would remain in force until May 1, 1920. The Milburn agreement, under which the company now operates, would be in effect again after this date with all of its previous fare and franchise restrictions.

The company has made an effort to operate cars. In fact, it has been operating cars since the strike to the extent that it could secure men for the purpose.

P. R. T. Urges Employees to Buy Liberty Bonds

T. E. Mitten, president of the Philadelphia Rapid Transit Company, on Oct. 1 sent to all employees of the company a letter reading as follows:

> The average pay of this company's employees has been advanced over 90 per cent since June, 1913.
>
> The average cost of living has here been increased 66 per cent since June, 1913. (Cost of living, as published by the Bureau of Labor Statistics.)
>
> Secretary McAdoo is quoted as saying that "Those who spend everything they earn are not only living in a fool's paradise, but they are doing a grievous injury to their country. They are living in a fool's paradise because the same degree of prosperity cannot be expected to continue upon the return of peace."
>
> For your own sake and the sake of the future of your family—*SAVE NOW.*
>
> For the sake of your country in its hour of need, invest your savings in Liberty Bonds. The government wants all the money we can spare to help win the war, and will pay us 4¼ per cent interest.
>
> Those of us who stay at home and earn these good wages must now come forward and do our part.
>
> The management earnestly requests that you sign the inclosed order on the treasuser for 10 per cent of your pay for the six months beginning Oct. 12, and return this order in the inclosed envelope. The result will be a subscription of over $500,000 to the Fourth Liberty Loan, and a very substantial addition to your savings account.
>
> Let us all now sign up and show our patriotism in this unmistakable way.

On Oct. 13 a second letter was sent, explaining that up to that time some 3000 subscriptions had been received. It stated, however, that for those who desired to adopt such a plan the payments for the bonds need be only 5 per cent rather than 10 per cent of the wages per month, the payments to continue over a year instead of six months. This plan, it was explained, would apply to all applications filed unless the treasurer was otherwise directed in writing.

The men have responded very generously with their subscriptions.

Seattle Sale Attacked

Municipal Ownership Advocate Sees City Piling Up Deficit of $1,590,000 Annually on Present Basis

Oliver T. Erickson, one of the strongest municipal ownership advocates in the City Council of Seattle, Wash., and the backer and supporter of the present municipal railway in Seattle, has attacked the city's pending deal to pay $15,000,000 for the railway lines of the Puget Sound Traction, Light & Power Company. Mr. Erickson after investigation expresses the belief that $15,000,000 is more than the property is worth. He fears that an effort to operate the system on the basis of the purchase price so far discussed may prove a "black eye" for municipal ownership. He states that on a 5-cent fare basis there is a possibility of a deficit of $1,590,794 annually. When the negotiations for the property were under way, Mr. Erickson was out of the city.

SKEPTICAL ABOUT INCREASED FARES

Mr. Erickson says the vital question is not what the lines cost, or what it would cost to duplicate them, but whether the city can take them over on such a valuation and operate without piling up losses. He says:

"What may be done with fares above 5 cents is problematical. Increasing revenue by increasing fares has a very limited range, due mostly to the advent of the automobile. The $750,000 interest charge, of course, would begin to decrease after five years, and other expenses may decrease, but that leaves plenty of room for speculation."

In replying to Councilman Erickson's statements, Mayor Ole Hanson says that he is preparing a detailed reply to show that the city is making a good deal in buying the traction property. Thomas F. Murphine, Superintendent of Public Utilities, is preparing a statement to combat Mr. Erickson's figures.

Due to the time required in checking up the traction properties, city officials stated that it would probably be Oct. 15 before the accountants at work on the books had completed their work.

Walter F. Meier, Corporation Counsel, has been instructed by the City Council to prepare an ordinance authorizing the issuance of the bonds, and the formal transfer of the property. The bonds will be for twenty years and bear interest at 5 per cent.

SUBURBAN LINE OFFERED

The Seattle & Rainier Valley Railway recently made its first definite offer to sell the line to the city of Seattle. The property was tendered to the city for the sum of approximately $1,600,000. Acceptance of the offer, however, has not yet been determined upon. President Sampsell presented a statement showing that the company has outstanding securities of $1,755,443, but states that he is willing to turn the property over to the city at a sum approximating $1,650,000, accepting 5 per cent bonds in payment.

Chicago Staggers Hours

Follows the Lead of Washington and New York in Attempt to Spread the Rush-Hour Peak

The spread of Spanish influenza in Chicago, Ill., led to the prohibition of smoking on cars during the week ended Oct. 12 and is likely to bring about the staggered-hour plan of opening and closing a number of large establishments.

At a meeting of national, state and city members of the influenza commission on Oct. 14, the prohibition of smoking was agreed to as a very necessary measure to prevent the spread of this disease.

On most of the elevated lines there has always been a special smoking car on each train. The new rule against smoking will make these extra cars available for general service and it is expected that the order will thus relieve congestion.

On the surface lines smoking has always been permitted on the front platform. The medical authorities agreed that there was an unusual amount of expectorating by smokers and this had a tendency to spread influenza and other diseases. The officials of both companies were agreeable to the change and the commissioner of health announced that it would become effective at once. The rule will be enforced by the police department.

As a first step in the line of staggered hours for opening and closing, the managers of the State Street department stores announced that they would have their employees report for duty in three shifts, instead of one. A concerted effort will be made to have this system extended in all industrial establishments in the loop district, including the big stores and downtown factories. This move is being promoted by the Association of Commerce, the Illinois Manufacturers' Association, the Office Building Managers' Association, and the State Street merchants. It is expected to have a considerable effect in reducing the peak load mornings and evenings.

Favorable Action on D. C. Belt Line

A favorable decision has been reached by the War and Navy Departments for the establishment of a belt line at Washington, D. C., to relieve electric railway congestion in the center of the city and to accommodate government workers in West Potomac Park. The plan for this belt line formed the subject of a section of the reports of John A. Beeler to the Public Utilities Commission during the summer.

Objection to the plan was made, especially by the War Department, in that it called for the laying of car tracks on B Street through a portion of the Mall, which, officials thought, would mar the beauty of the park. This objection was withdrawn on Oct. 6. The line will be used by both the Capital Traction Company and the Washington Railway & Electric Company.

It is understood that official objection to the plan was withdrawn in the face of the pressing public necessity for better electric railway facilities. The plan involves the laying of new tracks over a portion of the route. The government will either construct them or guarantee the cost.

The District Commissioners have turned the matter over to the Bureau of Industrial Housing, Otto M. Eidlitz, director, who has full power to build any railway necessary to accommodate war workers.

Agree on Pittsburgh Wages

At meetings on Oct. 2 motormen and conductors of the Pittsburgh (Pa.) Railway voted to accept an increase in wages making the maximum pay 48 cents an hour, and agreed to consent to temporary changes in the schedules. The men agreed also to work such hours as are deemed necessary in carrying on the war work of the district.

Effective on Sept. 16 the receivers for the company agree to the following changes in wages:

Present wages: First six months, 37 cents an hour; second six months, 39 cents an hour; second year, 41 cents an hour; third year and thereafter, 45 cents an hour.

New wages: First three months, 43 cents an hour; next nine months, 46 cents an hour; first year and thereafter, 48 cents an hour.

News Notes

Portland May Employ Women.—The Portland Railway, Light & Power Company, Portland, Ore., is considering the employment of women. The matter is being taken up with the employees.

Influenza Stops Road.—So serious were the inroads made among its employees by the Spanish influenza that the Brattleboro (Vt.) Street Railway, included in the system of the Twin State Gas & Electric Company, was compelled to suspend service on Oct. 11.

Labor Matters Adjusted.—All misunderstandings between the employees of the Seattle & Rainier Valley Railway, Seattle, Wash., and that company, which threatened to cause a strike, have been settled satisfactorily. Back wages will be paid the men for the month of August. If the city of Seattle does not purchase the railway, as is now contemplated, the matter of an increase in wages will be referred to the War Labor Board.

Examinations for Car Equipment Inspectors.—The United States Civil Service Commission announces an open competitive examination for senior inspector of car equipment. Applicants must be between twenty-five and sixty years of age, have had at least five years' experience as master mechanic, master car builder, general car foreman or similar service, and within two years preceding the date of application have been in active service in such capacity. Applications must be filed with the Civil Service Commission, Washington, D. C., by Nov. 12. The work is to be with the Interstate Commerce Commission.

New Working Terms Wanted.—A ten-hour work day is asked by the motormen and conductors of the Washington Railway & Electric Company, Washington, D. C., in an agreement which they have submitted to the company. A letter accompanying the agreement asks that representatives of the union be granted a conference with officials of the company to consider the terms of the memorandum. No changes in the wage scale are asked for, the company having recently put into effect a new scale of 43 cents an hour for the first three months, 46 cents an hour for the next nine months and 48 cents thereafter.

Portland Wages Before Board.—The matter of allowing a 60 per cent increase in wages demanded by interurban train operators employed by the Portland Railway, Light & Power Company, Portland, Ore., will be decided by the War Labor Board. A review of the testimony has been forwarded to Washington, D. C. Franklin T. Griffith, president of the company, in testifying stated that the men have already been granted substantial increases and that their new demand, if granted, would mean an increase of 128 per cent over what was paid in June, 1917. The application for an increase was filed by the trainmen, engineers and conductors on a basis of 79 cents an hour for conductors, 53 cents for brakemen, 73 cents for motormen and 53¾ cents for trolleymen. The present scale is 48½ cents for conductors and motormen.

Wages and Fares Coupled.—A delegation representing employees and officials of the Springfield (Mo.) Traction Company, waited on the City Council recently with a request to make an appointment for the purpose of discussing the new demands of the railway workers for an increase in wages. All the members of the delegation assured the Council that the negotiations between the employees and the company for an increase in compensation are of an entirely friendly nature. E. C. Deal, general manager of the company, intimated that the only means apparent to the officials of the company by which to raise the money to pay the increase demanded would be through raising the fares. Mr. Deal said: "It is a matter in which all the citizens of Springfield are interested and our suggestion is that a committee of prominent citizens should be appointed to look into the question and make a report recommending the proper course to pursue."

Financial and Corporate

Receiver Fagan a Fighter

Stands Out Stoutly for What He Regards as the Best Interest of Pittsburgh Railways

Charles A. Fagan, one of the receivers of the Pittsburgh (Pa.) Railways, on Oct. 8 in the United States District Court filed a petition and answer dissenting from the answer of his colleagues, J. D. Callery and H. S. A. Stewart, who had replied to the recent petitions of the Colonial Trust Company and the Union Trust Company, trustees, demanding payments of about $100,000 in the way of fixed charges.

WOULD CONSERVE FUNDS

Mr. Fagan thus continues his opposition to the expenditure of funds in the hands of the receivers of the Pittsburgh Railways for fixed charges and interest due bondholders of underlying companies, in the face of the uncertain results from the 7-cent fare, the recent annual wage increase of approximately $450,000, and the paramount need of rehabilitating the system.

The majority receivers concurred in the filing of the answer, so far as admitting that the amounts were due. Receivers Callery and Stewart did not state specifically in their answer that they believed that the money should be paid to the bondholders represented by the trust companies.

The petitions demanding that the interest due the bondholders of the Washington & Canonsburg Street Railway and the Pittsburgh & West End Passenger Railway, Oct. 1, 1918, be paid were filed in the United States Court. The petitioners alleged that the two underlying companies were operating on a profitable basis and that the receipts in the hands of the receivers from the two systems were sufficient to pay the interest due. The amount involved is said to be $100,000.

RECEIVERS HAVE $1,118,053

Mr. Fagan declared that it was impossible for the receivers to ascertain what portion of the funds in the hands of the receivers had been derived from underlying companies. He said that the funds in the hands of the receivers on Sept. 5, 1918, are $1,118,053, and that the funds belong generally to all the creditors of the Pittsburgh Railways and not to any one creditor. He further avers that the receivers are under contract with the public to return excess money in the event that the Public Service Commission reverses the 7-cent fare schedule.

In his petition Mr. Fagan said:

"If all the fixed charges due and past due against the Pittsburgh Railways are paid and the court should order the expenditure of funds which municipalities have asked for improvements and if the receivers should expend the money already ordered by the court for improvements, the receivers would have insufficient funds to carry out their plans."

Mr. Fagan has asked that the court order a general survey of all the fixed charges of the Pittsburgh Railways past due, and determine what funds are necessary to be retained to make the betterments and improvements ordered by the court. He has asked further that some system be adopted by the receivers, with the approval of the court, by which such portions of the fixed charges shall be paid by the receivers as they fall due. He has still further asked that the court make an order by which the receivers shall be guided in the payments of fixed charges so that all creditors of the Pittsburgh Railways may be treated on equal basis.

Petaluma Sale Oct. 29

To aid in the reorganization of the Petaluma & Santa Rosa Railway, Petaluma, Cal., the reorganization committee on Oct. 8 asked authority from the State Railroad Commission to bid the property in and to pay off certain indebtedness. The reorganization committee is composed of Rudolph Spreckels, Frank A. Brush, George P. McNear, Allen I. Kittle, W. H. Hamilton, Russell Daurie, H. P. Goodman, James Otis and L. B. Maclay, and they have incorporated the Petaluma & Santa Rosa Railroad under the order of the Railroad Commission made on Aug. 16 last. The reorganized company has the following officers: Thomas Maclay, president; George P. McNear, vice-president and treasurer; and R. W. Wise, secretary.

According to the applicant railroad company, it wishes to bid for the property of the railway on Oct. 29, in a foreclosure sale ordered by the Superior Court of Sonoma County, and it has proposed to pay for it with bonds to the amount of $750,000 issued by the reorganized railroad, through an exchange process with the old company's bonds. In addition, the newly incorporated railroad has sold its stock in the sum of $72,730, and it asks authority to expend $66,400 of that amount in discharging five notes for different sums.

The authority asked is carrying out the purpose of the reorganization agreement.

The approval of the reorganization plan of the company was referred to in the ELECTRIC RAILWAY JOURNAL for Aug. 31, page 387, at which time the terms of the reorganization were reviewed.

Canadian Line Scrapped

Electrification of Competing Line and Rise of Auto Compel Suspension by London & Lake Erie Line

Following a period of uncertainty in which municipal purchase and scrapping seemed alternate probabilities, the London & Lake Erie Railway & Transportation Company, London, Ont., has gone the latter route. Freight and passenger service terminated, on twenty-four hours notice, on the night of Oct. 9. The rails, according to report, will go to Japan, while cars, overhead and other property are being disposed of to half a dozen parties who have made offers of purchase.

COMPANY WANTED TO SELL

The company offered some months ago to sell out to London, Ont., St. Thomas, Port Stanley, Lambeth and the other municipalities served, at $445,000, representing about 50 per cent of the bonded indebtedness. Sir Adam Beck, London, Ont., secured a report from engineers of the Ontario Hydroelectric Power Commission showing that the road would meet capital charges, with no allowance for taxes or depreciation, if $241,000 were paid in 5 per cent bonds. He reported further that the road had a scrap value of $261,000 against which a charge of $20,000 would have to be made for dismantling and disposing of the railway property.

The company rejected the offer but after announcing in May that it would scrap the line at once, it continued negotiations with a group of Lambeth citizens, who reported on Oct. 8 to a meeting of municipal representatives in London that they believed the company would sell for $325,000. Sir Adam Beck presented a report showing that since May $8,000 a year would have to be added to operating costs, as the people could no more readily avoid paying advanced wages than the private company. The purchase was therefore considered no longer feasible. Sir Adam suggested as an alternative plan that London and other places directly concerned buy a 10 or 12-mile section south from London to Lambeth or Tempo, tie this in with the London Street Railway system and hand it over to the latter for operation, at a "fair profit."

PROMPT TO DISCONTINUE SERVICE

The directors of the London & Lake Erie Railway & Transportation Company held a meeting immediately afterward and determined to discontinue service the following night, abandon negotiations for the sale and dispose of the physical property of the company without delay.

As stated some months ago in the ELECTRIC RAILWAY JOURNAL, the electrification of the paralleling London & Port Stanley Railway and the development of the use of autos in the rural districts destroyed the earning capacity of the former once prosperous line.

Spokane Company Earnings

Washington Water Power Company Shows Surplus of $940,709 After Paying Dividends

The income, profit and loss statement of the Washington Water Power Company, Spokane, Wash., for the year ended Dec. 31, 1917, follows:

Gross revenue		$2,856,213
Operating expenses	$1,172,129	
Taxes	268,735	
Uncollectible accounts, etc.	10,028	1,450,892
Gross income from operations		$1,405,321
Deductions from income		769,280
Net income		$636,041
Surplus Dec. 31, 1916	$922,796	
Credit adjustments prior years	1,472	924,268
		$1,560,309
Dividends paid		619,600
Surplus Dec. 31, 1917		$940,709

No separate figures are given in this company's report for light and power and for railway earnings, but it is stated that the number of passengers carried increased from 15,601,850 in 1916 to 17,305,047 in 1917, and that the gross railway receipts gained 15 per cent in the last year.

Owing to the location of the company in the interior, it has not enjoyed, except in the mining district, the prosperity from war business which has been experienced in some parts of the country. The additional business that has come to it, however, is of normal growth and will probably be permanent.

The car-miles in 1917 totaled 3,839,830 as compared to 3,666,944 in 1916, and the car-hours were 534,775 and 413,259 respectively. One-man cars are operated on two-thirds of the total car mileage. The company's records, it is said, show a perceptible decrease in accidents on the one-man car lines.

The total expenditures for additions and betterments in 1917 were $456,417, of which $32,407 was for the railway department.

One Value for Rates and Taxes

The State administration of North Dakota contemplates the valuation by the State of every public utility within its boundaries, to determine a basis for tax assessments and service charges. The valuation is being made for the State Tax Commission and the Railroad Commission by Hagenah & Erickson, Chicago, Ill. Physical property in practically all of the companies in the State has been valued and the accountants are beginning on the books.

When the valuations have been fixed by the engineers the companies will have an opportunity to come in for a hearing and ask that the valuation be increased or decreased. They will be heard both as to taxes and rates, and then an official State valuation will be announced. Thereafter the valuation, it is said, will increase or decrease as State engineers give companies credit for additions and betterments and charge off depreciation. If a company comes into court to complain that its valuation is placed too high for taxation purposes it may be reduced, but the reduced valuation will be used as the basis in rate cases.

Mr. Erickson of the firm which is conducting the valuation work was a member of the original utilities commission of three which established the practices that made the Wisconsin plan a model for other states. Mr. Hagenah was a consulting engineer employed by the Wisconsin Railroad Commission.

North American Net Reduced

The comparative income statement of the North American Company, New York, N. Y., for the calendar years 1916 and 1917 follows:

	1917	1916
Interest received or accrued	$493,852	$450,131
Dividends received	1,571,675	1,824,278
Profits and compensation for services	33,766	29,920
Total	$2,099,293	$2,304,329
Administrative expenses	$100,212	$77,961
Taxes	87,507	33,334
Interest paid or accrued	108,007	17,491
Accounts written off and reserves	......	13,625
Total	$295,726	$142,411
Net income	$1,803,567	$2,161,918
Dividends paid or accrued	1,489,665	1,489,665
Balance forward	$313,902	$672,253

This company derives its income almost entirely from interest and dividend payments by subsidiaries. In general the operating revenues of all such enterprises increased during 1917, but the operating expenses also rose to such an extent as to leave smaller margins for dividends after provision for increased interest charges. This explains a large part of the loss of almost 54 per cent in the year's surplus income of the holding company, although it should be noted that the expenses of this concern were more than doubled.

The results of operation of the two leading railway subsidiaries, the Milwaukee Electric Railway & Light Company and the United Railways of St. Louis, were noted in the ELECTRIC RAILWAY JOURNAL of July 13 and Sept. 14 respectively.

Omaha Net Falls

Gross Revenues Rise 4 Per Cent But Higher Operating Costs Cut Into Earning Power

During the year ended Dec. 31, 1917, the gross operating revenues of the Omaha & Council Bluffs Street Railway, Omaha, Neb., increased $141,833 or 4.36 per cent as compared to those in 1916. During the same period, however, the operating expenses rose $184,584 or 10.07 per cent, and the net income fell off $68,328 or 13.4 per cent.

WAGE BONUS $25,494

On July 1 a bonus of 6 per cent of the wages earned during the previous six months was paid to each employee in the service at that time whose earnings did not exceed $100 a month. This bonus amounted to **$25,494. Effective** on July 1 the wage scale of the trainmen was increased 2 cents an hour, and a general increase in wages was made in the shops and all other operating departments. The increased cost of operating the power plant during the year was $53,790, owing to increased cost of labor and fuel.

Taxes continued to rise, the total taxes for the year being $315,589, an increase of $26,613. Most of this increase was caused by the increase in the federal income tax from 2 per cent to 6 per cent of the net income.

NET SURPLUS $42,108

Despite the large increase in operating expenses, owing to the increased cost of labor, fuel and all materials necessary to the operation of the road, the company had a net surplus for the year of $42,108, after paying the usual dividends of 5 per cent on the preferred stock and 4 per cent on the common stock.

The balance shown in accrued depreciation, as of Jan. 1, 1918, was $1,573,886. Of this amount $110,145 was charged to the account during the year for rebuilding tracks and other renewals. Moreover, $288,551 was expended during the year for additions and betterments. No new extensions were made, the principal item of expenditures being for the purchase of forty semi-steel pay-as-you-enter passenger cars.

COMPARATIVE INCOME STATEMENT OF OMAHA & COUNCIL BLUFFS STREET RAILWAY FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation	$3,190,834	93.98	$3,069,324	94.35
Revenue from other operations	204,326	6.02	184,003	5.65
Gross operating revenues	$3,395,160	100.00	$3,253,327	100.00
Operating expenses	2,017,731	59.43	1,833,146	56.35
Net operating revenue	$1,377,429	40.57	$1,420,180	43.65
Taxes assignable to railway operations	314,572	9.27	288,679	8.85
Operating income	$1,062,857	31.30	$1,131,501	34.80
Other income	17,368	0.51	14,839	0.45
Gross income	$1,080,225	31.81	$1,146,340	35.25
Deductions from income	638,417	18.80	636,204	19.56
Net income	$441,808	13.01	$510,136	15.69
Dividends	399,700	11.77	400,000	12.30
Surplus for year	$42,108	1.24	$110,136	3.39

Financial News Notes

Wants City to Take Line.—A hearing was held at Topeka, Kan., on Oct. 5 on the application of the Kansas Electric Utilities Company to the Public Utilities Commission for permission to junk its plant. At the hearing officers of the company told the commission that they would be glad to turn the line over to the city of Parsons if the city would operate the road for the benefit of the citizens. The company said it could not afford to continue the operation of the line under the terms and conditions that exist at present. The losses of the company were referred to briefly in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 5, page 634.

Stockholders Await Road's Fate.—Stockholders in the Southern Illinois Traction Company, for several years in the hands of a receiver, expect that when the United States District Court convenes on Oct. 21 in special session at East St. Louis, Ill., a final report and order to sell assets will be issued. The rails have been laid for about ten years and never used. This is the road in which former United States Senator William Lorimer, as the head of Lorimer & Gallagher, was interested. The East St. Louis terminus of the line is at Fourth Street and Broadway. At one time the company obtained a franchise for a St. Louis loop and planned to come into the city via the free bridge. The St. Louis franchise was later revoked.

Receiver's Appointment Confirmed.—The appointment of Harrison B. Freeman, Hartford, Conn., as temporary receiver of the Hartford & Springfield Street Railway, Warehouse Point, Conn., was confirmed by Judge William S. Case on Oct. 14. The appraisers appointed are Warren P. Bristol, local manager of the Connecticut Company at Hartford, and Walter P. Schwabe, Thompsonville, general manager of the Northern Connecticut Light & Power Company. The receiver is authorized to continue the business for four months. The appointment of Mr. Freeman as temporary receiver was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 12, page 672.

Abandonment Stopped by Injunction.—Judge Oliver Branch of the Superior Court at Claremont, N. H., has issued an injunction restraining the Claremont Railway & Lighting Company from discontinuing its freight and passenger service. The company had announced its intention of taking this step on Oct. 19 unless a purchaser for the property came forward. Judge Branch acted on petition of manufacturers and town officials. He set Oct. 15 for a hearing on the question of appointing a receiver for the property. The company operates 6 miles of line. The decision to abandon the road was referred to briefly in the issue of the ELECTRIC RAILWAY JOURNAL of Oct. 5, page 634.

Will Abandon Forty-four Miles.—When the new tariff of the Berkshire Street Railway, Pittsfield, Mass., referred to elsewhere in this issue, goes into effect on Nov. 12, service will be discontinued for the present at least on the "Huckleberry" line from Lee to Huntington and from Great Barrington to Egremont and from Great Barrington to Canaan, Conn. By this order 44 miles of track will be abandoned as follows: From Lee to Huntington, 24 miles; from Great Barrington to Egremont 7 miles; from Great Barrington to Canaan, 13 miles. This order will probably mean giving up the power station at Sheffield and transferring the operating base to Housatonic.

Bristol County Line Dismantled.—Swift-McNutt Company, Boston, Mass., has dismantled the property of the Bristol County Street Railway and its line running from Hebronville to Taunton. This is the whole of the company's property with the exception of the 3½-mile branch from Briggs Corner to Attleboro, which was purchased by the city of Attleboro and is being operated under the name of the "A. B. C. Railway," under an arrangement with the Interstate Consolidated Street Railway. The Bristol County Street Railway is the predecessor company which some time ago took back under its unsatisfied mortgage the property being used by the reorganized company, the Taunton & Pawtucket Street Railway. Notes in regard to efforts to save the line from dismantlement were published in the ELECTRIC RAILWAY JOURNAL of Jan. 26, Feb. 16, May 4 and Aug. 1.

Government Funds to Rehabilitate Line.—William B. Cutter, receiver of the Buffalo & Depew Railway, Buffalo, N. Y., has been granted permission by Justice Louis W. Marcus in the Supreme Court of Erie County to issue $45,000 of receiver's certificates, and to execute a contract with the United States Housing Corporation of the Bureau of Industrial Housing and Transportation of the Federal Department of Labor, for the rehabilitation and re-equipment of the line. Under this contract the government will buy the receiver's certificates and the proceeds will be applied to the extension of the railroad one-half mile into the village of Lancaster and the renewal of a part of its roadbed. In addition to taking these certificates, the government also agrees to buy twelve additional cars and a new 300-kw. rotary converter and lease them to the receiver for the period of the war. This order and contract are the result of efforts made by the American Car & Foundry Company, Depew, to have the government aid in the rehabilitation of the road. The extension will be between Depew and Lancaster.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '18	$23,054	$11,944	$11,110	$596	$10,514
1m., Aug., '17	24,863	12,408	12,455	430	12,025
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., July, '18	$216,072	*$171,814	$44,258	$35,839	$8,418
1m., July, '17	220,802	*143,462	77,340	35,790	41,550
7m., July, '18	1,179,532	*1,021,780	157,752	250,926	93,174
7m., July, '17	1,218,890	*885,051	333,839	250,385	83,454
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., Aug., '18	$1,696,059	$54,325	$1,641,734	$31,819	$1,609,915
1m., Aug., '17	1,366,659	30,809	1,335,850	226	1,335,624
12m., Aug., '18	21,661,286	423,096	21,238,190	52,241	21,185,949
12m., Aug., '17	17,296,942	320,588	16,976,354	3,264	16,973,089
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., July, '18	$57,656	*$36,013	$21,643	$11,772	$9,871
1m., July, '17	56,772	*33,540	23,232	11,439	11,793
7m., July, '18	313,849	*211,884	101,965	80,711	21,254
7m., July, '17	300,093	*186,100	113,993	82,007	31,986
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., July, '18	$251,823	*$159,850	$91,973	$39,523	$52,42
1m., July, '17	175,143	*116,321	58,822	37,192	21,633
12m., July, '18	2,462,034	*1,599,471	862,563	466,650	395,913
12m., July, '17	1,962,079	*1,301,593	660,486	443,142	217,344

*Includes taxes. ‡ Includes non-operating income.

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
12m., Aug., '18	$6,915,831	$4,494,572	$2,421,259	$1,109,035	$1,312,224
12m., Aug., '17	6,019,418	3,391,350	2,248,068	948,121	1,479,947
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
1m., Aug., '18	$2,725,190	$1,843,234	$881,956	$818,358	$63,598
1m., Aug., '17	2,436,680	1,404,966	1,031,714	812,440	219,274
2m., Aug., '18	5,451,453	3,523,787	1,927,665	1,632,644	295,021
2m., Aug., '17	4,874,074	2,834,441	2,039,633	1,623,771	415,862
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO					
1m., Aug., '18	$445,648	*$337,060	$108,588	$103,645	‡$39,643
1m., Aug., '17	426,115	*274,715	151,400	85,282	‡73,167
12m., Aug., '18	5,552,609	*3,961,496	1,591,113	1,143,063	‡563,449
12m., Aug., '17	4,444,721	*2,847,949	1,596,772	939,530	‡701,590
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., July, '18	$1,000,340	*$634,767	$365,573	$316,992	$48,581
1m., July, '17	586,369	*401,049	185,320	192,735	†7,415
12m., July, '18	10,927,234	*6,782,383	4,144,851	2,626,716	1,518,135
12m., July, '17	8,734,738	*5,318,963	3,415,775	2,263,456	1,152,319
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., July, '18	$97,977	*$69,992	$27,985	$25,496	$2,489
1m., July, '17	78,072	*53,543	24,529	24,352	177
12m., July, '18	1,091,340	*735,802	355,538	297,053	58,485
12m., July, '17	897,533	*595,688	301,845	286,971	14.873

Traffic and Transportation

Southern Fare Review

New Orleans Gets Increase—Many Other Rate Cases Still Pending, Including Atlanta

The news from various sections of the Southeast regarding electric railways carries a feeling of optimism. The Alabama Public Service Commission has granted the Anniston Traction Company the right to increase car fares to 6 cents over the entire system with the exception of the Oxford line, on which there will be a 10-cent fare. Permission was likewise granted the Mobile Electric Company to charge 6 cents, with the stipulation that the increase shall remain in effect until after the signing of a general peace. Although the Montgomery Traction Company asked for 7 cents it was allowed an increase to 6 cents. It was also ordered that transfers be given over all the lines, thereby forcing the company to extend this privilege to Pickett Springs and Camp Sheridan. Present rules governing the sale of tickets to school children must be continued and the company must render safe and adequate service. The Georgia Railroad Commission has allowed the Augusta-Aiken Railway & Electric Company to increase its fare from 5 cents to 6 cents. As a concession to the public, the commissioner's order requires that no changes shall be made in regulations regarding transfers, nor any changes in the regulations governing the transportation of infants. The petition of the Athens Railway & Light Company will be heard on Nov. 5.

Following out the recommendations of the War Finance Corporation the City Council of New Orleans has passed an ordinance granting an increase of 35 per cent in rates for gas and electricity. On a writ of injunction filed by attorneys for organized labor, however, orders were issued by Judge Gage in the Civil District Court, for the officials of the New Orleans Railway & Light Company to appear on Oct. 16 and show cause why an injunction should not be issued restraining the company from putting the power increases into effect and charging fares in excess of 5 cents.

The War Finance Corporation loaned the company $1,000,000 with the understanding that the city would allow an increase in rates. The opposition to the increase is coming from organized labor in the face of a recent ruling by the War Labor Board, whereby wages of the employees of the company were increased in some instances as high as 70 per cent. The agitation has elicited from the War Labor Board a letter to John R. Alpine, acting president of the American Federation of Labor, as noted on page 709 of this issue.

Taking the position that a public utility company could not be expected to increase its expenses by paying higher wages to employees, without an opportunity to increase its income by means of higher fares, the War Labor Board has put itself on record at last, and the decision in this case will probably have a far-reaching effect. The outcome of the New Orleans situation will have considerable bearing on the Atlanta hearing set for Oct. 14, which in a measure is a parallel case to that of New Orleans.

Five Cents in Indianapolis

The Public Service Commission of Indiana on Oct. 12 granted the Indianapolis Traction & Terminal Company a straight 5-cent cash fare, effective at midnight, on Oct. 13. A charge of 1 cent is to be made for all transfers when issued, and this 1-cent charge is to be rebated when the transfer is offered in payment of fare, in accordance with the transfer regulations.

The sale of 4-cent tickets is discontinued, but patrons may tender these tickets in payment of fare until Oct. 20, when any surplus tickets will be redeemed by the company. The sale of tickets at the rate of five for 25 cents is covered by the new order of the commission.

The decision of the commission also agrees to the proposal which was accepted by the Indianapolis Traction & Terminal Company, covering the appointment of three directors to the company by the Governor of Indiana, the Mayor of Indianapolis and the Indianapolis Chamber of Commerce respectively.

The commission also recommended that to enable the company to compete in the labor market and secure sufficient men for the operation of its cars a 50 per cent increase in its wage budget should be made. The company on Oct. 13 announced that the new wage schedule for motormen and conductors in the employ of the company would be as follows:

In service one year or less, 34 cents; more than one year and less than two years, 35 cents; more than two years and less than three years, 36 cents; more than three years and less than four years, 37 cents; more than four years and less than five years, 38 cents; five years and over, 39 cents.

Increases in wages will also be made in other operating departments of the company.

The new fare system is to be tried for sixty days, at which time it will be determined whether the revenue produced will be adequate.

Columbus Case Reargued

Representatives of the Eastern Bondholders Insist Upon Right to Surrender Franchise

Arguments were heard before United States District Judge H. C. Hollister on Oct. 10 in the case of Eastern bondholders against the city of Columbus, Ohio, to prevent the enforcement of the ordinance which requires the Columbus Railway, Power & Light Company to operate on the basis of eight tickets for a quarter. The allegations were similar to those made in the case brought some time ago by the company itself, except that the protection of bondholders living outside of the State of Ohio was made a consideration in the appeal.

FIRST SUIT DISMISSED

Judge D. C. Westenhaver of Cleveland dismissed the first suit for want of jurisdiction and in his comments said it is not within the province of a court to nullify a contract between the city and a public service corporation. The sanctity of contracts must be upheld, he contended, although he advised the city to enact legislation that would give the company needed relief from the burdens brought on by war conditions.

The principal question argued in the later suit was whether the contract really was binding upon the company, if it wished to give it up, and how much the company was affected by the conditions arising out of war emergency. City Solicitor Scarlett contended that there was no statute under which the company could be released from the contract. He quoted extensively from Judge Westenhaver's opinion. He explained, however, that the City Council was now taking steps to look into the company's financial condition and have an appraisal of its property made with a view to arriving at a fair basis for an increase in the rate of fare. Mr. Scarlett said that members of the Council did not feel they could rely upon the statements furnished by the management of the company.

PREVIOUS ARGUMENT REITERATED

J. S. Clark, president of the E. W. Clark Management Company, by which the road is operated, presented its case. He followed the same line of argument used in the first case. He said that the franchise granted the company in 1901 gave it the privilege of operating on the streets of the city, and that it could be terminated at any time. It was shown that the old rate of fare, eight tickets for a quarter, would not pay the expense of operation, especially since the wages of employees have been so materially increased. The fact that the Federal War Labor Board had recommended an increase in the rate of fare, when the decision on employees' wages was announced, was among the subjects that received attention at the hearing.

Freight Rates Increased

Commission Allows Connecticut Company 40-50 Per Cent Advance in Station-Service Freight Charges

Because of increased operating costs the Connecticut Company, New Haven, Conn., has been authorized by the Public Utilities Commission to advance still farther the freight rates which went into effect on Jan. 1, 1918. The present authorization made effective on Oct. 15 the following rates for one-class station-service freight: 15 cents per 100 lb. for a distance not exceeding 5 miles, and 1 cent per 100 lb. for each additional 5 miles or fraction thereof, the minimum charge being 35 cents for shipment.

STATEMENT OF RATES

Under the old rates the minimum charge was 10 cents per 100 lb. for a short haul of not exceeding 10 miles, the maximum charge being 29 cents per 100 lb. for the longest haul on the system. Under the proposed schedule submitted by the petitioner, the minimum rate would have been 26 cents per 100 lb. for a short haul of not exceeding 5 miles, with a maximum charge of 49 cents per 100 lb. for the longest haul and a minimum charge of 50 cents per shipment.

In commenting upon the proposal the Connecticut Public Service Commission says:

"The proposed rates would represent from 140 to 150 per cent increase over the present rates. The company established a rate solely upon a comparative basis, irrespective of the reasonableness of the return on the amount invested, which is contrary to all well-recognized rate-making principles. It also disregards certain material elements of expense connected with steam railroads, not present in trolley freight service, notably expensive terminal facilities.

"The rates proposed, which are applicable to all less-than-carload shipments (as the company has only one classification) are substantially the same as the first-class rates of the New York, New Haven & Hartford Railroad, although the latter has six classifications and only a small percentage of its freight is carried as first class. The proposed rates cannot, therefore, be justly claimed to be on a parity with steam railroad rates, as they are 55 per cent higher than the average of the second, third and fourth-class steam railroad rates. The petitioner claims that this increase over steam railroad rates is justifiable because of the better and more expeditious service which it renders.

LIBERAL RATE POLICY NECESSARY

"In establishing a rate at this time to meet emergency conditions, the commission feels that a liberal policy should be followed in order that utility companies may be maintained at their maximum efficiency. Such a policy, however, does not contemplate the establishment of rates which would cause an unnecessary burden upon the public."

Taking into consideration, therefore, the question of depreciation, the increase in wages, the probable future increase in cost of material and supplies, and also the fact that the company's entire business is not producing sufficient revenue to pay operating expenses and fixed charges, the commission decided that an average 40 per cent to 50 per cent increase in station-service freight rates would be reasonable, even with the assumption that a certain per cent increase in rate would not yield a like per cent increase in revenue.

Two Cents a Mile in Holyoke

The Holyoke (Mass.) Street Railway has applied to the Public Service Commission of Massachusetts for the right to put into effect a new fare system on Oct. 30 which will be on a 2-mile basis at approximately 2 cents a mile and will be in the nature of a universal zone system. Permission to sell tickets at the rate of twelve for $1 will also be sought. The proposal is to divide the operations of the company's cars into twenty zones and will still further reduce the riding power of a nickel. The new project does away with lapovers and will simplify the operation of the cars to a considerable extent, and transfers will be issued to ticket holders only. The changes that are proposed in the tariff which has just been filed with the commission affect the Holyoke, Chicopee, Amherst and Sunderland lines of the company.

The City Hall will be the center of the inner zone and the company proposes to charge a 5-cent fare from that point to any point within the inner zone. To ride from one point within the inner zone to another point in the same zone will cost 10 cents in cash or 8⅓ cents by use of tickets. This will mean a double fare when a passenger rides through the zone, past the City Hall.

On the Westfield line there will be three fare limits from the Holyoke City Hall to the Westfield town line. The Chicopee, Chicopee Falls and Springfield lines will have the same fare limits, but instead of being able to make the trip for 6⅔ cents by the use of tickets it will cost 8⅓ cents using tickets, or 10 cents cash fare.

Two registers, one for cash and the other for tickets and transfers will be installed in all cars. Passengers using tickets can obtain transfers, but otherwise transfers will not be issued. A cash fare of 5 cents will allow a person to ride no further than 2 miles. A ticket for which 8⅓ cents has been paid will allow of a ride of approximately 4 miles.

Zone fares have been in effect in the city of Holyoke since Feb. 17. The situation there with respect to revenue obtained by the Holyoke Street Railway was reviewed in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 14, page 456.

Berkshire Fare Increase

Company at Pittsfield, Mass., Will Retain Five-Cent Unit, But Stop Some Lines

After a careful investigation of the use made by the public of the Berkshires of the service of the Berkshire Street Railway, Pittsfield, Mass., a plan has been worked out and has been filed with the Public Service Commission providing for a uniform rate over the entire system and still maintaining the 5-cent piece as the unit of fare. This has been accomplished by a rearrangement of the fare zone in the suburban territory and a reduction of the fare area in the cities.

The plan contemplates a circle with a radius of approximately 3 miles from the center of North Adams, the center of Pittsfield and the center of Great Barrington. Within that radius the fare will be 5 cents, with certain charges for transfers. Beyond this there will be an additional fare of 5 cents, making the fare from North Adams to Williamstown and Adams 10 cents, from Pittsfield to Dalton 10 cents, and from Great Barrington to Housatonic 10 cents. The portions of the lines outside of the outer circles have been divided into zones of approximately 2 miles each, in each of which zones a 5-cent fare will be charged. It is proposed further that at certain hours of the day transfers will be issued within the inner circle at Pittsfield and North Adams without extra charge, and that at other times a charge of 2 cents will be made for a transfer.

Under this arrangement the fare from Pittsfield to Berkshire will be 15 cents, to Cheshire 25 cents, to Adams Center 35 cents, and to North Adams 45 cents, with the addition of the war tax for all fares over 35 cents.

The fare from Pittsfield to Lenox village will be 20 cents, to Lee 25 cents, to South Lee 35 cents, to Stockbridge 40 cents, to Glendale 45 cents, to Housatonic 50 cents, and to Great Barrington 60 cents, with the addition of the war tax for all fares over 35 cents.

It is the hope of the management that it will not be necessary to abandon and scrap any of the company's property, but for the present at least, it is proposed to discontinue service upon the lines south and west of Great Barrington and upon the line from Lee to Huntington. This is necessitated in order that the company may continue a going concern and not be forced to discontinue service essential to the communities from Great Barrington to the Vermont State line. The management says that without the increase in revenue coupled with economies to be obtained by a discontinuance of service now operated at a loss, the property can no longer be run so as to give the required service to this more densely-settled portion of the county.

The new tariff will go into effect on Nov. 12. After that date 44 miles of track will be abandoned.

Court Hears New Jersey Case

The Public Service Railway, Newark, N. J., began charging a 7-cent fare on Oct. 15, the date set by the Board of Public Utility Commissioners for the new fare. Each passenger is receiving a receipt for the extra 2 cents, however, pending the final court ruling.

The question of issuing these extra fare receipts came before Justice Swayze at the hearing held by him at his home on Oct. 10 on the writ obtained by the League of Municipalities to prevent the new fare being put into effect. The court at this hearing gave it as his conclusion that the legal right to have the status quo preserved was clear. He said that while it had been demonstrated to him by President T. N. McCarter of the railway that the plan which had been suggested for giving receipts for the 2 cents was impracticable, some other arrangement could probably be devised to relieve the situation. The system of receipts now in force was then worked out by the company.

The matter of the rebate slips out of the way, Justice Swayze heard argument on Oct. 14 by both sides as to the validity of the order of the utility commission for the 7-cent fare. At the conclusion of this argument Judge Swayze announced that he would decide the case on or before Nov. 19, the day on which the Court of Errors and Appeals opens. If the case is decided against the company an appeal will probably be taken at once to the Court of Errors and Appeals. An early adjudication is anticipated.

Fare Review at Trenton

Justice Trenchard in the New Jersey Supreme Court has allowed a writ to the city of Trenton to review the decision of the Board of Public Utility Commissioners whereby the Trenton & Mercer County Traction Corporation was authorized to charge a flat 6-cent fare for service beginning on Oct. 15. Under the order of Justice Trenchard the writ will act as a stay pending litigation of the new rate unless the company can devise some plan whereby it will give its passengers receipts entitling them to a refund of the excess fare paid under the new rate in the event of the Supreme Court reversing the rate advance allowed by the commission.

At a conference between Justices Trenchard and Swayze and counsel for the city and the company it was agreed that the final hearing to determine the legality of the commission's 6-cent fare decision would be held before Justice Swayze at Newark on Oct. 16. Justice Swayze will sit as the Supreme Court, and it is expected that his decision in this case will be handed down shortly afterward. At the conference on Oct. 11 the company said it would be difficult to get the receipts for excess fare printed in time to use them by Oct. 15. Justice Swayze said it was entirely up to the company whether it gave receipts and collected the new rate or whether the writ should act as a stay pending the suit. Justice Trenchard told the company that a system of receipts could be worked out satisfactorily. He pointed out that two classes of riders must be provided for in the scheme—those using strip tickets and those paying cash fares.

George L. Record, counsel for the city of Trenton at the conference, contended that there was no such thing as emergency rates as were contemplated by the public utility law of the State and that the State body acted without legal authority.

Chamber of Commerce Report Unsatisfactory

The special traction committee of the Chamber of Commerce of Norfolk, Va., has made its final report to the board of directors. Among other things, the report states that the committee has found itself "powerless to reach any satisfactory understanding with the Virginia Railway & Power Company for better service, and the matter has to be finally settled by the City Council." Furthermore, that the committee "feels that the service to and from the Army and Navy bases is inadequate and that the company should be required to give such service as will obviate the necessity on the part of the government of using army trucks for transportation" of its employees. The committee recommended that Delos F. Wilcox, who made a report on the traction problem in 1914, be brought to Norfolk again to make a report up to date. Finally, the committee went on record as being opposed to the City Council granting the Virginia Railway & Power Company the right to increase its fares to 6 cents until it first makes improvements in its service to justify the increase. The report has been adopted by the full chamber.

Chicago Fare Hearing Closed

The second hearing before the Public Utilities Commission of Illinois on the petition of the Chicago Elevated Railroads for a 7-cent fare was postponed from Sept. 30 to Oct. 7 because city officials who were to appear in opposition were detained on other matters. The hearings were held on Oct. 7, 8 and 9, the final summing up taking place on the last date.

The discussion and arguments concerned chiefly what increase in revenue the 7-cent fare would produce. As stated in the report of the first hearing in the ELECTRIC RAILWAY JOURNAL for Sept. 8, page 592, Britton I. Budd, president of the Chicago Elevated Railroads, testified that judging from the reports of other companies operating with increased fares he believed the 7-cent fare would produce an increase in gross revenue not exceeding 20 per cent or $2,000,000 while the requirements are $2,447,000.

The case is now in the hands of the commission.

Transportation News Notes

Eight Cents in Wilkes-Barre.—The Wilkes-Barre (Pa.) Railway went to an 8-cent fare on Oct. 1.

Benton Harbor Asks Relief.—C. K. Minary, president Benton Harbor-St. Joe Railway & Light Company, has asked the Boston Harbor City Council for the right to charge a higher fare.

Survey of Scranton Conditions.—Delos F. Wilcox has been retained by the City of Scranton, Pa., to inquire into and report on the situation affecting service and rates on the Scranton Railway.

Jitney Fares Ten Cents.—Jitney bus fares in San Francisco, Cal., were raised on Oct. 14 to 10 cents, following a meeting of the Jitney Drivers' Union. There were only 270 jitneys on the streets of the city at that time.

Six Cents in Racine.—The 6-cent fare for adults and the 3-cent fare for children, granted to the Milwaukee Heat, Light & Traction Company, operating in Racine, Wis., was put into effect on Oct. 6. The decision of the Railroad Commission of Wisconsin in this case was rendered on Sept. 10.

Six Cents Wanted in Niagara.—The International Railway, Buffalo, N. Y., has asked the Council of Niagara Falls, N. Y., in which it operates, to approve an increase in fare from 5 cents to 6 cents. The Council has taken the request under consideration pending reference to the Public Service Commission.

Harrisburg Increase in Effect.—The 5-cent fare passed out of existence in Harrisburg, Pa., on Oct. 1, when the Harrisburg Railways added 1 cent and the Valley Railways 2 cents to the nickel charge. Certificates are being issued to each passenger for redemption in case the Public Service Commission rules against the increase.

Wants Freight Rate Increase.—The New Jersey & Pennsylvania Traction Company has filed with the Board of Public Utility Commissioners of New Jersey a schedule of proposed increases in freight rates on its lines between Trenton and Princeton. Besides extra charges for smaller articles, there are also increases provided for the freightage of lumber, machinery, etc. There will be a public hearing on Oct. 22 on the company's application for increased passenger rates.

New Seattle-Tacoma Rates.—A new passenger tariff has been filed with the Public Service Commission of Washington by the Puget Sound Electric Railway, increasing the one-way fare between Seattle and Tacoma, and all way points and terminals. The round-trip fare will remain the same.

The new tariff provides for an increase in the one-way fare from 73 cents to 91 cents, between Seattle and Tacoma, and from 2 cents to 2½ cents a mile on way points and terminals.

More Seven-Cent Fares Announced.—The Philadelphia & Easton Electric Railway, Doylestown, Pa., has filed notice of an increase of fares from 6 to 7 cents, and advances in freight and milk rates with the Public Service Commission. Other notices of 7-cent fares have been filed by the Citizens' Traction Company, operating in Oil City, Franklin, and vicinity, while the Lancaster & York Furnace Street Railway, Millersville, Pa., has given notice of an increase in 5-cent fare zones, causing increases in single fares.

Seven Cents for Vicksburg.—At a special meeting of the Aldermen of Vicksburg, Miss., held recently for the purpose of taking up with the Vicksburg Light & Traction Company the readjustment of fares, it was ordered by the board that the city attorney prepare an ordinance together with necessary resolutions allowing the company to make a charge of 7 cents for all fares. Where tickets are purchased, however, a discount of three-fourths of a cent on each fare will be made by the company, thus making all such fares 6¼ cents. Tickets for school children are to remain at the same price as in the past.

San Antonio Plea Rejected.—The City Commission of San Antonio, Tex., at the regular Council meeting on Oct. 3 adopted an ordinance denying the application of the traction department of the San Antonio Public Service Corporation for an increase of fares to 6 cents or the alternative of eliminating the transfer and provided that a violation of the 5-cent fare and transfer provisions of the franchise would constitute a misdemeanor, punishable upon conviction by a fine and subject the company to forfeiture of its franchise. The ordinance was adopted by unanimous vote of the Mayor and Commissioners present.

After Dishonest Conductors.—As a result of a careful investigation the New York State Railways has discovered that considerable of the money collected in fares on the Utica lines does not reach the company. In consequence it caused the arrest recently of three conductors, Floyd V. Carter, Ernest W. Miller, and Thomas J. Donnelly. The men were arrested upon the complaint of J. N. Jones, superintendent of transportation of the Utica lines. When arraigned in court Carter and Donnelly pleaded guilty and were sentenced to thirty days while Miller, who pleaded not guilty, was released on $200 bail for trial later.

Charleston Fare Hearing Nov. 7.—The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has applied to the Railroad Commission of South Carolina for an increase in passenger rates over the line, viz.; a straight fare of 5 cents, at all times and at all hours, from the city boundary to the navy yard, with an additional straight fare of 3 cents from the navy yard to North Charleston, with the privilege of a return ticket from the navy yard to North Charleston of 5 cents. The commission will hold a public hearing in regard to the matter in Charleston on Nov. 7.

Six Cents and Tickets in Galveston.—The Galveston (Tex.) Electric Company is now charging a 6-cent fare, with half fares for children under twelve and for school children. The ordinance recently passed by the City Commission became effective on Oct. 1. No change was made in regard to transfers. According to an announcement made by the general manager, the company will place on sale books of tickets, each book containing ten tickets for 60 cents for the convenience of patrons who do not wish to be troubled with pennies. The tickets will be on sale at the carhouses and at all drug stores and other principal places of business in the city.

Will Vote on Jitney Return.—The voters of Los Angeles, Cal., are to be called upon at the election on Nov. 5 to decide whether the proposed ordinance shall be adopted which has been submitted by initiative petition and makes lawful the operation of jitney buses in the downtown district, from which they are now excluded. Inclosed with the ballots at the election will be an argument against the ordinance by George Baker Anderson, in which the voters are appealed to convincingly to vote against the measure. As part of the argument against the ordinance are included the reasons advanced by the New York Commission in ruling against the jitney.

Six-Cent Ordinance for Austin.—The City Council of Austin, Tex., has ordered the city attorney to draft an ordinance authorizing the Austin Street Railway to charge 6 cents for full fares and 3 cents for half fares, with 3 cents as the fare for students. This action was taken after a hearing on a petition presented by the company asking authority to increase fares. The request of the company was reinforced by a petition from the employees of the railway setting forth that the employees should have a wage increase and that the company had declined to increase wages unless it was authorized to increase fares. It is regarded as quite certain that the Council will pass the ordinance when it is drafted by the city attorney.

Court May Fix Fare.—In commenting on the appointment of a receiver for the Binghamton (N. Y.) Railway the *Republican* of that city made the following statement about fares: "In connection with the going of the company into receivership it is interesting to learn that probably the rate of carfare will be increased far beyond what it would have been fixed at if the Council had allowed the rate to be raised. The company has applied for permission to raise it to 8 cents. That is reported as higher than if the Council had granted its permission. But the court will probably issue an order fixing the carfare at about 8 or 9 cents, and that will be all. There are many Councils, but only one court, and what that court says, according to the attorneys, goes."

Fare Referendum in Houston.—Qualified voters of Houston are to have an opportunity to say at the polls whether or not the Houston Electric Company shall be permitted to charge a 6-cent fare, with half fares at 3 cents. When the City Council decided that the company was entitled to the increased fare an ordinance was passed to that effect, to become effective on Oct. 1. A referendum petition was filed during the week ended Oct. 5, which made the ordinance void pending an election if it was found that sufficient qualified voters had signed. The city secretary has found that the number signing the petition is sufficient and he will so report to the Council. It then becomes the duty of the Council to call a special election or repeal the ordinance.

Six Cents for Montgomery.—The Public Service Commission of Alabama has rendered a decision providing for a fare of 6 cents on all lines of the Montgomery Traction & Light Company, Montgomery, Ala. The order of the commission also requires that transfers be given to and from all lines and that a safe and adequate service be established. The company, under the order, must continue its present rules relative to the hauling of children of certain ages, and the granting of cut rate tickets to school children. The order was made effective as of Oct. 5. The company first applied to the City Commissioners for a 7-cent fare. This was granted, but the Public Service Commission set the rate aside, holding it alone had jurisdiction. That commission then authorized a 6-cent fare.

Increase in Fare Averted.—John Scott, electric railway commissioner, Franklin County, Ohio, found that the Westerville interurban line of the Columbus Railway, Power & Light Company was on the tax duplicate for a valuation of $1,100,000, while the valuation on which the franchise is based was $300,000. He went to the Public Utilities Commission and the tax valuation was reduced to $350,000. The company had been setting aside $900 a month to pay the tax for 1918. Under the reduction in valuation only $325 a month is required. The point with Mr. Scott is that the sinking fund, used as a barometer for the rate of fare, had fallen below the required $15,000 and an increase seemed imminent. The surplus saving through the reduction of the tax value, however, makes the fund more than $20,000 and the threatened increase in the rate of fare has been averted for the present. Operation under this franchise after it had been in effect a year was described in the ELECTRIC RAILWAY JOURNAL for Aug. 10, page 230.

Personal Mention

New Vice-President

R. L. Warner, Boston Banker, Succeeds Murray Carleton as Vice-President of United Railways, St. Louis

At the meeting of the board of directors of the United Railways, St. Louis, Mo., held on Oct. 8, the resignation of David R. Francis, Jr., who has entered the army, was accepted. In his place R. L. Warner was elected a director of the company. Murray Carleton resigned as vice-president of the company and Mr. Warner was elected vice-president in his place. Mr. Warner will begin his duties with the company as soon as he makes his arrangements to move to St. Louis. He will devote his attention principally to the finances and public relations of the company.

Mr. Warner was born in Kansas City, Mo., in 1869, and was graduated as a mechanical engineer at Cornell University in 1892. He then entered the service of the Westinghouse Company and was with that company for fourteen years, engaged in manufacturing, engineering, selling and management. He was for several years the New England manager, resident at Boston. In 1906 he formed a partnership with Randolph F. Tucker in the banking firm of Warner-Tucker & Company, Boston. He will terminate his connection with the firm and move to St. Louis.

During his connection with the Westinghouse Company and later with Warner-Tucker & Company, Mr. Warner has been connected with the organization, construction, financing and operation of various electric railways, more particularly in Connecticut and Massachusetts. He has also been active in the development of a number of water-power and other public service enterprises in New England and in the South, and one steam railroad—the South Carolina Western. This steam railroad is now consolidated with the Seaboard Air Line. His work in the various enterprises with which he has been connected has had largely to do with the construction, financing and reorganization of properties.

G. W. Van Derzee, for the last five years assistant to S. B. Way, vice-president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will also continue as assistant general manager with little change in his present duties.

J. H. Lucas, formerly assistant to H. A. Mullett, superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been appointed superintendent of rolling stock of the company to succeed H. A. Mullett, who has become assistant general manager of the company.

C. E. Haygood, manager of the railway department of the Manila Electric Railroad & Light Company, Manila, P. I., is visiting the United States on a vacation and for the purpose of consulting with the officers of the J. G. White Management Corporation, New York, N. Y., the operating managers of the Manila Company. He expects to return to the Philippines before the first of the year.

H. A. Mullett, formerly superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been appointed assistant general manager of that company. He will generally assist S. B. Way, vice-president and general manager, and assume such other duties as may be assigned to him. Mr. Mullett has been with the company twelve years, seven years of which he spent as superintendent of rolling stock.

Samuel E. Smith has resigned as general manager of railways of the Reading Transit & Light Company, Reading, Pa., effective on Oct. 31, to accept a similar position with the Mobile Light & Railroad Company, Mobile, Ala. Mr. Smith has been manager of railways of the Reading Transit & Light Company since last January. Before that he was superintendent of railways of the company. He entered business as a cash boy in a department store in Reading. He next became connected with the dispatching and storehouse department of the Philadelphia & Reading Railroad. He left railroad work to enter the service of the Holophane Glass Company in New York. About a year later he joined the forces of the Atlantic Refining Company. His next position was with the Monticello Company at Reading and Trenton, dealers in brick. His connection with the Reading Transit & Light Company followed six years later. His first work for the company was as purchasing agent. Subsequently he became claim agent of the company. With the change in control of the railway and light property at Reading Mr. Smith was made superintendent of railways.

Dressel D. Ewing, who for the last five years has been connected with the department of electrical engineering at Purdue University, has been made professor of electric railway engineering. He is a graduate of Ohio Northern University where he specialized in electrical and mechanical engineering. Upon completion of his course in 1906 he spent a short time in cable work, but soon entered the railway field as rodman in the maintenance-of-way department of the Missouri Pacific Railway at St. Louis, Mo. After serving as transit man and assistant engineer on this railway he became assistant division engineer of the Hocking Valley Railway at Logan, Ohio, where he had charge of the field and office engineering incident to the reconstruction of some 50 miles of track, which had been damaged by a heavy flood, and to the construction of a large new classification yard in the mining district. In the fall of 1907 Professor Ewing returned to Ohio Northern University as professor of electrical and mechanical engineering. In 1912 he went to Purdue for a year's graduate work, specializing in railway electrification. At the end of the year he was appointed assistant professor of electrical engineering and later was made associate professor of electric railway engineering. In connection with his college work he has done some consulting engineering along general lines and has spent several summers in the railway project section of the general engineering division, Westinghouse Electric & Manufacturing Company, where he was engaged on railway electrification work. For the past three years he has spent a considerable portion of his vacation time in editorial work for the ELECTRIC RAILWAY JOURNAL.

Obituary

R. M. Dixon, president of the Safety Car Heating & Lighting Company, New York, N. Y., died of heart disease at his home on Oct. 16. Mr. Dixon was one of the trustees of the United Engineering Society. He was also treasurer of the New York Railroad Club.

William Allis, son of the late E. P. Allis, died on Oct. 10 at the age of sixty-nine years. Mr. Allis succeeded his father as president of the E. P. Allis Company, Milwaukee, Wis., and continued in that position until the consolidation which resulted in placing the Allis-Chalmers Company at the head of the largest engine-building corporations of the world. He then became chairman of the board of directors.

Joseph Parkin, who was the responsible operator and one of the receivers of the Seattle, Renton & Southern Railway, Seattle, Wash., the predecessor of the Seattle & Rainier Valley Railway, Seattle, Wash., is dead. Mr. Parkin was the first superintendent after the construction of the road, and from 1893 to 1897 he was superintendent of the Seattle-Everett Traction Company. For eight years prior to his appointment as receiver of the Seattle, Renton & Southern Railway in 1912 he was employed in the United States Engineering Department in connection with the Puget Sound fortifications. Mr. Parkin was forty-five years old.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Railroad Conditions Improving in New England

Approach of Winter, However, Makes it Advisable to Secure Shipments as Soon as Possible

Electric railway purchasing agents are at present enjoying much better railroad service than was common in the Northeast a few months back. Deliveries are now being handled extremely well, despite the shortage of labor in so many lines of industry. Within the factories conditions are unfavorable to prompt filling of orders, even with the necessary priority classification; but once shipments enter New England their movement to their destinations is reported to be better than for some time past.

CASES OF SHIPMENTS GOING ASTRAY REDUCING IN NUMBER

To be sure, there are some cases of stray shipments, a prominent purchasing agent stated in a recent conference, but probably not many more than in normal times. It is rarely necessary at this time to detach tracers from electric railway office staffs in order to follow up supply shipments on New England rails, and this releases skilled labor for other important work where it is greatly needed.

The railroads are heavily taxed with business and the approach of winter with its threatened embargoes makes the present a highly desirable time to utilize existing facilities to the utmost. An enormous traffic in coal is moving into New England in anticipation of cold weather demands, and the requirements of our overseas forces in rolling stock and motive power are so heavy that there is little certainty of the winter's passing without a good many trying embargoes.

Now is clearly the time for purchasing bureaus to follow up factory production and deliveries as closely as possible, so that all the material which can be shipped before snow flies may be sent into the consumer's territory. "A few dollars spent in follow-up work now may save the loss of hundreds or thousands of dollars later when the non-arrival of important rolling stock parts or other supplies cuts down the available car units on the system below the point of efficient schedule handling.

A good deal of way and roadway maintenance material is being purchased, and the necessity for replacing tracks and other worn-out equipment with available supplies from scattered sources makes it important to watch shipment dates very carefully. Follow-up work by wire is meeting the present situation reasonably well, so far as relations with the railroads go.

With the increasing employment of women in the offices of purchasing agents, it is desirable to bring out the important aspects of the railroad shipment problem for future action if need be. This applies to other sections of the country as well as to New England.

Rush shipments are occasionally made by motor truck where the completion of an important construction job requires it, as in the extension of central station power plant facilities in which electric railways are to share the benefit; but in general, it appears unnecessary to resort to expensive methods of shipping supplies where the railroad trunk line service is being as well handled as in New England.

The really weak spot in the delivery chain is in the factory producing the supplies and equipment needed, and for six or eight weeks more it is expected that the railroad conditions will continue reasonably favorable to the consignee, considering the load which the transportation companies are carrying and that which is in sight for the end of the year.

St. Louis Car Labor Award

National War Labor Board Renders Decision Raising Day Rates 25 Per Cent

On Friday, Oct. 11, the National War Labor Board rendered its decision and award in the controversy between the St. Louis Car Company and its employees. The case has been pending for five months. A preliminary agreement was reached on May 15 and conferences were held but the two parties could not reach a final agreement. The case was therefore again submitted to the National Board.

The decision just handed down provided for a 25 per cent increase in day work rates over wages in effect on June 15, piece rates to be adjusted by a conference between the company and employees. A guaranteed minimum hourly or daily wage rate is provided for but it is not to operate so as to reduce anyone's pay. The increased wages are retroactive from June 15.

Working hours and overtime are discussed with the latter fully defined. For plain overtime work time and a half is allowed but for Sundays and holidays double time.

The award is to remain in force for the period of the war but provisions are made for application for adjustments at semi-annual periods.

Standardization Resulting from War Conditions

Large Numbers of Types and Sizes of Electrical Goods Now Being Eliminated

In a few ways the entrance of the United States into the war has been a blessing in disguise. Not the least of these pertains to the standardization of electrical supplies. It has in the past been more the rule than the exception to hunt for something special when a new use arose than to employ a standard article. In certain lines it was felt to be almost necessary to add every so often new devices to an already large number that would do equally well.

In some lines that have been closely controlled standardization of product has progressed far. In lines less closely controlled it has been difficult to get the manufacturers to agree on standards. The Associated Manufacturers of Electrical Supplies has done considerable in the different sections. By a free exchange of ideas and opinions a number of standards have resulted and many special designs have been removed from catalogs.

Now, however, that raw materials are so necessary for purely war purposes, standardization is virtually forced on a willing industry. By a sweeping curtailment in the number of types and sizes of appliances and supplies, almost all of the special equipment is put aside. Those styles and sizes that remain, it would be natural to suppose, will be those for which the greatest demand exists and which satisfy, and can be used in the greatest number of instances. In other words, they will virtually become the standards.

The manufacturer has had to take such action but the benefits that will result so far as he is concerned are apparent. By being reduced to a standard output he would under normal conditions be able to produce more cheaply and his operation should show less waste in material. He will have no worry about a competitor getting out a special product. He will be able to save in his catalog and in his sales expenses. Besides these benefits, there are others.

The only question that arises is to what extent the styles and sizes that have been eliminated will again be placed on the market when the supply of raw material becomes easier. It is doubtful if they will all come back under any circumstances, as many of them have not been especially active.

Car Cord Very Scarce and High in Price

Although Cotton Has Dropped 20 Per Cent There Are No Indications That Cord Will Follow

Conditions in the braided cord market have been getting very unsatisfactory from the buyer's point of view for some time. While prices have not advanced for over two months, they are very high. Cords such as are used by electric railways were quoted this week at $1 per pound. This is an increase of somewhat more than 150 per cent in two years. The price then was 38 cents per pound. This was increased to 85 cents and finally to the present price of $1.

Even at this price, however, it is almost impossible to obtain any quantity of cord. No stocks of any appreciable size are apparent and deliveries are very poor. It is probable, however, that roads can obtain sufficient for their immediate needs either by utilizing some different grade of cord or else shopping around and perhaps paying a premium for immediate shipment of what they want.

The situation in the basic cotton market, of course, is at the bottom of the whole thing. The high price of cotton necessitated an advance in the price of cord. However, now that cotton has dropped off some 20 per cent from its recent peak price there is no indication that cotton cord will follow downward. What small amount of cord there is now available was probably fabricated from high-priced cotton and the same is true of that cord which will be available for some weeks. It is improbable with the shortage of cord in the market that the manufacturers will accept any less on their high-priced cotton and therefore it seems natural to expect that present prices will prevail for some time.

Coal Production Suffers Slump

Bituminous Output Falls Off 3.6 Per Cent and Anthracite Slightly

The output of bituminous coal during the week ended Oct. 5 decreased 462,000 net tons or 3.6 per cent compared with the week preceding but exceeded production during the week of Oct. 5, 1917, by 1,774,000 net tons or approximately 16 per cent, according to the regular weekly report of the Geological Survey. Estimates placed production (including lignite and coal made into coke) at 12,585,000 net tons as compared with 13,047,000 net tons during the week ended Sept. 28 and as against 10,811,000 net tons during the corresponding week of 1917. The average production per working day during the current week is estimated at 2,097,000 net tons, 78,000 net tons lower than the daily average during week of Sept. 28, but 295,000 net tons in excess of the daily average of the same week last year.

The production during the week of Oct. 5 while considerably lower than the week preceding, exceeded the weekly requirements by 4 per cent and the weekly requirements to make up the past deficit by 3.2 per cent.

Production of anthracite during the week ended Oct. 5 is estimated at 2,052,000 net tons, a slight decrease compared to the week preceding and the same tonnage as produced during the corresponding week of last year. Daily average is estimated at 342,000 net tons as compared with 338,000 net tons for the coal year to date and as against 331,000 net tons during the same period of 1917. The total production for the coal year to date is estimated at 53,703,000 net tons, an increase of approximately 2 per cent over last year.

Specifications for W. M., B. & F. C. St. Ry. Cars

Specifications on the three new motor cars ordered by the Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa., as reported in the ELECTRIC RAILWAY JOURNAL of Oct. 12, are as follows:

Number of cars ordered	3
Name of road	Webster, Monessen, Belle Vernon & Fayette City Street Railway
Date order was placed	Aug. 20, 1918
Date of delivery	Oct. 8, 1918
Builder of car body	Cincinnati Car Co.
Type of car	Semi-convertible
Seating capacity	31
Length over all	32 ft., 0 in.
Width over all	8 ft., 3½ in.
Body	Wood
Interior trim	Cherry
Roof	Monitor
Car trimmings	Curtain Supply Co.
Control	West K-11-A
Hand brakes	Cincinnati Car Co.
Heater equipment	Consolidated
Headlights	Incandescent
Motors	Westinghouse No. 68
Seats	Hale & Kilburn
Trucks	Peckham No. 7-D

NEW YORK METAL MARKET PRICES

	Oct. 3	Oct. 17
Copper, ingots, cents per lb	26	26
Copper wire base, cents per lb	28.75	28.75
Lead, cents per lb	8.05	8.05
Nickel, cents per lb	40	40
Spelter, cents per lb	9.35	9.05
Tin, Chinese*, cents per lb	......	......
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

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* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Oct. 3	Oct. 17
Heavy copper, cents per lb	23.50 to 24.50	23.50 to 24.00
Light copper, cents per lb	21.00 to 21.50	20.50 to 21.50
Red brass, cents per lb	22.00 to 23.00	23.00 to 24.00
Yellow brass, cents per lb	15.50 to 16.00	15.00 to 16.00
Lead, heavy, cents per lb	7.50 to 8.00	7.50 to 8.00
Zinc, cents per lb	7.50 to 8.00	7.50 to 8.00
Steel car axles, Chicago, per net ton	$41.52	$41.52
Old carwheels, Chicago, per gross ton	$29.00	$29.00
Steel rails (scrap), Chicago, per gross ton	$34.00	$34.00
Steel rails (relaying), Chicago, gross ton	$60.00	$60.00
Machine shop turnings, Chicago, net ton	$16.25	$16.96

ELECTRIC RAILWAY MATERIAL PRICES

	Oct. 3	Oct. 17
Rubber-covered wire base, New York, cents per lb	34	34
Weatherproof wire (100 lb. lots), cents per lb., New York	34.40 to 36.75	38.75 to 40.00
Weatherproof wire (100 lb. lots), cents per lb., Chicago	35.00 to 37.72	35.00 to 39.00
T rails (A. S. C. E. standard), per gross ton	$70.00 to $80.00	$70.00 to $80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$67.50	$67.50
T rails (A. S' C. E. standard), 500 ton lots, per gross ton	$63.50	$62.50
T rail, high (Shanghai), cents per lb	4¼	4½
Rails, girder (grooved), cents per lb	4¼	4½
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents erp lb	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	*3¼	*3¼
Tie plates (brace type), cents per lb	*3¼	*3¼
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	*3¼	*3¼
Angle plates, cents per lb	*3¼	*3¼
Angle bars, cents per lb	*3¼	*3¼
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount	79%	79%
Waste, wool (according to grade), cents per lb	15 to 25	15 to 25
Waste cotton (100 lb. bale), cents per lb	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	$38.50	$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$42.50	$42.50
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.90	‡1.80
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.92	‡1.82
White lead (100 lb. keg), New York, cents per lb	14	14
Turpentine (bbl. lots), New York, cents per gal	64	64

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* Government price. † These prices are f. o. b. works, with boxing charges extra.

‡Bid price, no quotation.

Franchises

San Diego, Cal.—A temporary permit has been granted by the City Council of San Diego to the Emergency Fleet Corporation to lay street car tracks from Thirty-second Street to the shipyard site, pending the granting of a franchise. While the tracks and the franchise will be held in the name of the Emergency Fleet Corporation, cars will be operated to the plant by the San Diego Electric Railway.

Bridgeport, Conn.—The Public Utilities Commission of Connecticut has granted the petition of the Connecticut Company for its approval of the method of construction of a single-track electric railway in Bridgeport for a distance of about 3400 ft., together with a 300-ft. turnout east of Noble Avenue. The construction of this railway is made necessary by war emergencies, and the company presented its petition to the commission at the request of the United States Housing Corporation.

Newburyport, Mass.—The Bay State Street Railway has been granted permission by the Board of Aldermen for the relocation of its tracks on State Street from High Street to the Newbury line.

Bellaire, Ohio.—The Wheeling Traction Company has been granted a five-year franchise by the City Council to operate cars within the city limits of Bellaire.

Trade Notes

Tri-City Railway Company of Illinois, Rock Island, Ill.—The Public Utilities Commission of Illinois has denied the petition of the Tri-City Railway Company of Illinois for permission to construct an extension in Moline. The commission found the extension justified, but held that the shortage of labor and materials is such that it cannot be done at present.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—A contract has been awarded by the Washington, Baltimore & Annapolis Electric Railroad to the Union Switch & Signal Company, Swissvale, Pa., for block signaling to be installed on its double-track line between Naval Academy Junction and District Line near Washington. This is the second section of signaling to be recently undertaken on the main line of that road between Washington and Baltimore. The new signaling will protect 36 miles of track and thirty-seven switches with twenty blocks on a headway of approximately three minutes under caution and six minutes under clear signals. The signaling has been laid out to reduce this running time one-half by the later addition of intermediate signals when future traffic warrants. The apparatus will be similar to that employed in the first installation, involving continuous alternating current track circuits, style "N," color light signals, mounted on iron pipe posts and model 15 vane-type relays. The switch indicators will be of the light type with push-button attachment, and will be used in all switches. Power at 2200 volts, 25 cycles, will be secured from the railroad company's power system at Naval Academy Junction.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Sixtieth Street subway tunnel under the East River was "holed through" on Oct. 14. This tunnel is the one through which the line of the New York Municipal Railway Corporation, connecting Manhattan with Corona and Astoria, L. I., will be operated. This tunnel is the deepest of the five new tunnels under the East River. The construction work is being done by P. McGovern & Company, New York, under the supervision of the Public Service Commission for the First District of New York. It is expected that the tunnel will be completed early next year. When it is placed in operation trains will run through it from the Long Island City terminal to Seventh Avenue, thence to Times Square, New York, and south over the Broadway line now operated by the New York Municipal Railway Corporation.

Lebanon & Franklin Traction Company, Dayton, Ohio.—The Lebanon & Franklin Traction Company, which operates a line between Lebanon, Red Lion and Franklin, has applied to the Public Utilities Commission of Ohio for permission to discontinue the service and abandon the line.

Levis (Quebec) County Railway.—A report from Levis County Railway states that reconstruction is under way of 11½ miles of track. The company has completed 3 miles on the Quebec Bridge division and expects to complete 2 miles more before winter. The remainder will be completed next year.

Moose Jaw (Sask.) Electric Railway.—The City Council of Moose Jaw recently passed a resolution recommending that the Moose Jaw Electric Railway build a line from Fourth Avenue, S. W. and Coteau Street, west to Ninth Avenue, S. W., thence north on Second Avenue to Lillooet Street, thence along Lillooet Street to Fourth Avenue. If the company agrees to build this line at once the Council will submit a by-law to the ratepayers, providing for a straight 5-cent fare, will indorse the one-man car proposals for the duration of the war and will defer the collection of taxes for 1917 and 1918.

Virginia Railway & Power Company, Richmond, Va.—It is reported that the Virginia Railway & Power Copmany contemplates the double-tracking of its Bay Shore Line to the Naval Base.

Power Houses, Shops and Buildings

United Railways & Electric Company, Baltimore, Md.—A contract has been awarded by the United Railways & Electric Company to Frainie Brothers & Haigley, Baltimore, for the construction of a waiting station at Columbia Avenue and Putnam Street at a cost of about $10,000.

Long Island Railroad, New York, N. Y.—A contract has been awarded by the Long Island Railroad to the Austin Company, Cleveland, for the construction of a building, 60 ft. x 225 ft. at Jamaica, N. Y., to cost approximately $40,000.

Pacific Power & Light Company, Portland, Ore.—Additional equipment is being installed by the Pacific Power & Light Company at its reserve power plant in Astoria, consisting of a 700-hp. steam engine and a General Electric 750-kva. generator, the two being direct connected. The increased equipment will give its reserve plant a capacity of 1600 kw. The Hammond Lumber Company, Astoria, has ordered equipment for a steam-electric plant to produce power which will be sold to the Pacific Power & Light Company, and which the latter will distribute to shipyards and other industries in the vicinity. The equipment comprises Erie City boilers of the combined capacity of 1800 hp. and a General Electric 1500-kw. turbo-generator; also a Beyer barometric condenser, a 3000-hp. Cochrane feed-water heater and the necessary circulating and other auxiliary pumps.

Duquesne Light Company, Pittsburgh, Pa.—Preparations are being made by the Duquesne Light Company, which furnishes power to the Pittsburgh Railways, for the construction of an electric generating plant at Cheswick, to develop not less than 120,000 kw. The cost of the proposed plant is estimated at about $16,000,000, of which amount about 35 per cent will be contributed from federal funds.

West Penn Power Company, Pittsburgh, Pa.—Work has been begun on the construction of a large electric generating plant at Springdale by the West Penn Power Company, which is controlled by the West Penn Railways. The cost is estimated at $5,000,000. Contracts, it is understood, have been placed with the Westinghouse Electric & Manufacturing Company for two turbo-generators.

Virginia Railway & Power Company, Richmond, Va.—It is reported that the Virginia Railway & Power Company will install two boiler units to increase the capacity of its power plant at Norfolk.

New Advertising Literature

Sanford Riley Stoker Company, Worcester, Mass.: Bulletin No. 31 describing operations of Riley underfeed stokers.

W. S. Barstow & Company, Inc., New York, N. Y.: A sixty-one page booklet containing the latest financial and operating statistics for the various railway and other utility properties in which they are interested.

Beaumont Manufacturing Company, Philadelphia, Pa.: Catalog 37, giving descriptions, illustrations and dimensions of standard Beaumont gates for controlling the flow of granular materials from bunker. The design of ash pits under boilers and the correct gate to use for this purpose are illustrated.

Rolling Stock

Gary (Ind.) Street Railway is in the market for five motor and five trail cars.

United States Housing Corporation, we are advised, is in the market for twenty-five cars.

Cameguay (Cuba) Electric Company is reported to be in the market for six open passenger cars.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., reports that it is in the market for ten cars.

Springfield (Mass.) Street Railway has added a new style gravel car and trailer to its equipment. Both the operating car and the trailer are equipped with independent brake devices, while the trailer likewise has its independent equipment for dumping the cars.

Bangor Railway & Electric Company, Bangor, Me., has purchased from the Stone & Webster Company of Boston a freight and express car with a capacity of 30 tons. The company has also purchased from the American Car Company in St. Louis, three large one-man cars and their arrival is expected daily.

Virginia Railway & Power Company, Richmond, Va., it is reported will purchase twenty-five street cars of the latest improved type. It is understood that the money for the purchase will be advanced by the government to the traction company in the form of a loan. The cars will be used on the Norfolk lines.

San Francisco-Oakland Terminal Railways, Oakland, Cal., as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 5, has been delayed on account of the difficulty in securing necessary material, in the construction of the ten trail cars building in the company's own shops, but the work is now well under way.

Trade Notes

Chicago (Ill.) Pneumatic Tool Company announces the appointment of A. G. La Pierre as traffic manager and F. O. Southbrook as manager of the order and production department, with headquarters in the home office of the company, Fisher Building, Chicago.

Boston Woven Hose & Rubber Company, Boston, Mass., at its last annual meeting, elected George E. Hall president. Mr. Hall was formerly vice-president and general manager and succeeds Henry B. Sprague, treasurer, who served as president during a portion of the past year, pending the annual election. Mr. Sprague continues as treasurer and assumes the additional duties of vice-president. Mr. Hall has been associated with the company for eleven years.

Elliott Electric Company, Cleveland, Ohio, announces its removal from 322-328 Champlain Avenue to 813-815 Superior Avenue, N. W., where it occupies the entire five floors and basement. The first floor is occupied by the retail store and supply department office. The second floor is devoted to the general office and the machinery department office. The repair shop for the repairing of motors is on the fourth floor. The remaining floors and basement are utilized to accommodate the large stock of motors and electrical supplies.

Allen & Peck, Inc., Syracuse, N. Y., formally announce the retirement of C. Loomis Allen from the firm and the change of the firm name to Peck-Shannahan-Cherry, Inc. The business conducted is that of engineers and managers of public utilities, and offices will be maintained at rooms 412-413-414 Syracuse Savings Bank Building, Syracuse, N. Y., and at 601 Maryland Trust Building, Baltimore, Md. The members of the firm are: Edward F. Peck, J. N. Shannahan, T. C. Cherry, Milford Badgero, William J. Harvie and C. D. Porter.

Robert C. Byler, for nearly four years advertising production man for the SKF Ball Bearing Company, of Hartford, Conn., has been appointed advertising manager of the SKF Administrative Company of New York City and will direct the advertising of the SKF Ball Bearing Company, of Hartford, the Hess-Bright Manufacturing Company, of Philadelphia, and the Atlas Ball Company of the same city, all of which are controlled by the SKF Administrative Company. Until arrangements are made in New York City Mr. Byler will remain with SKF Ball Bearing Company, if Hartford, Conn.

Peacocks at Winnipeg

There are seventy-eight Peacock Brakes at Winnipeg, the grain center of America.

Some of these are on single-truck cars on which they are used exclusively and used successfully.

As Winnipeg cars are single-ended these brakes naturally see twice the usual service at the front end.

Of course, that doesn't phase a Peacock which is made to stand up under such service as eight applications a mile, eighty applications an hour, one thousand or more applications a day—all at one end of the car.

Single-end or double-end cars, single-truck or double-truck cars are alike easy for the Peacock which costs nothing to operate and next to nothing to maintain.

National Brake Company
Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

THE J. G. WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . . . NEW YORK
LONDON CHICAGO

STONE & WEBSTER
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
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343 District Bldg. Washington, D. C.

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ENGINEERS
REPORTS ◦ DESIGNS ◦ CONSTRUCTION ◦ MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT AND POWER PROPERTIES
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REPUBLIC ENGINEERS INC.
CONSULTING AND CONSTRUCTING ENGINEERS
Valuations Reports Investigations
Designs Construction Management
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Illuminating Bldg.
YOUNGSTOWN, OHIO
Mahoning Bank Bldg.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 SOUTH LA SALLE STREET
CHICAGO

You are a faithful subscriber and reader of the Electric Railway Journal. You know how useful it is to you. Why not give us the names of those of your electric railway friends who would also benefit by being subscribers to the Electric Railway Journal? We will be glad to send specimen copies to any names and addresses that you mention.
ELECTRIC RAILWAY JOURNAL

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
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WORCESTER, MASSACHUSETTS

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A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

THE MOST SUCCESSFUL MEN IN THE ELECTRIC RAILWAY INDUSTRY READ THE
ELECTRIC RAILWAY JOURNAL
EVERY WEEK

THE P. EDW. WISH SERVICE, Inc.
Suite 1710 DETECTIVES Suite 715
Park Row Bldg., New York Board of Trade Bldg., Boston

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co. Consulting Engineers
PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
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AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

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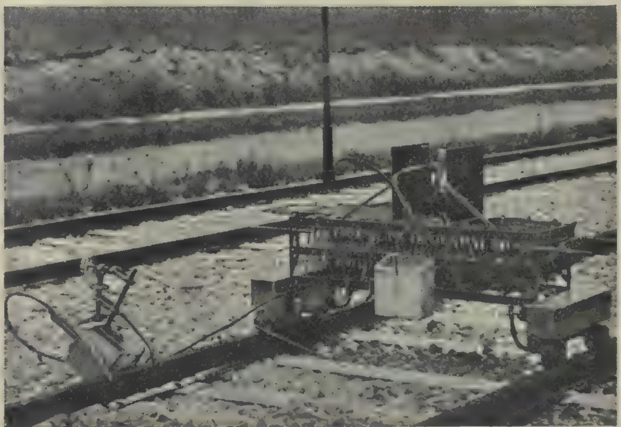
SMALL — STRONG — RIGID — PORTABLE

ERICO
Arc Welding Rheostat



Most welding rheostats are bulky and cumbersome, but the Erico answers the demand for one that can readily be taken to the work, as it weighs only 140 pounds.

The current can be regulated to any value between 60 and 195 amperes by switches, and it will operate on any voltage between 350 and 750.

An ideal rheostat for arc welding in the shop—and when fitted with flanged wheels and used in connection with the Erico Portable Welder it makes a fast, economical rail-bonding outfit.

Let us tell you more about it.

The Electric Railway Improvement Co.

Cleveland, Ohio

Every Fare Registered HERE
Without One Unnecessary Move HERE

INTERNATIONAL

Coin and Ticket Registers

Slowing up schedule speeds in a vain attempt to get all the fares is detrimental to the service which the War demands of the Electric Railways.

International Fare Boxes and Coin Registers permit an elderly conductor or an easily-rattled conductorette *to get all the fares* (cash, metal tickets and transfers) at a rate of speed which keeps the crowd and the cars moving.

In other words, changing labor conditions are met and overcome by these Registers—and maximum revenue is assured your line. *And this revenue can be applied to* Government monetary necessities or to equipment that will enable your line to render better service.

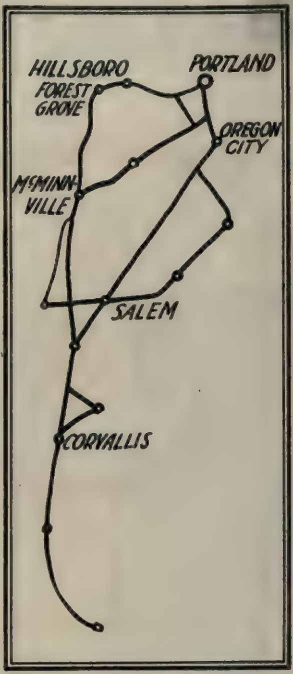
Where present conditions will not permit installation of above International Standard Single or Double Registers, foot operated are especially adapted for quick registration of fares.

Every type of fare, and every combination of cash, tickets and transfer can be handled by International Fare Registers, Coin Registers or Fare Boxes. The *motor-driven* machines are especially advantageous on single-end cars, or double-end cars operated over loop terminals.

Take it up with us.

The International Register Company

15 South Throop Street, CHICAGO, ILL.



Around the Continent With Hale and Kilburn

At Portland, the Rose City, on Southern Pacific Suburban Lines

Wherever the Southern Pacific Company is responsible for suburban and interurban electric operation, it gives as fine service and rolling stock as can be found anywhere. The 1200-volt lines between Portland, Corvallis and other places are just as conspicuous a proof as the electrified lines of the California Bay Cities.

Both installations are provided with Hale and Kilburn "Walkover" seats—rattan covered—for the short riding on one and plush-covered for the longer rides out of Portland.

Plush-covered seats, especially, must be well-made, if they are to hold their comfortable and neat-appearing shape year after year. Hale and Kilburn care in seat design and skill in spring placement take care of that in this kind of service or any other.

Have you seen the Hale and Kilburn No. 400?

HK WALKOVER COPYRIGHTED

Hale and Kilburn Corp.

Philadelphia
Washington
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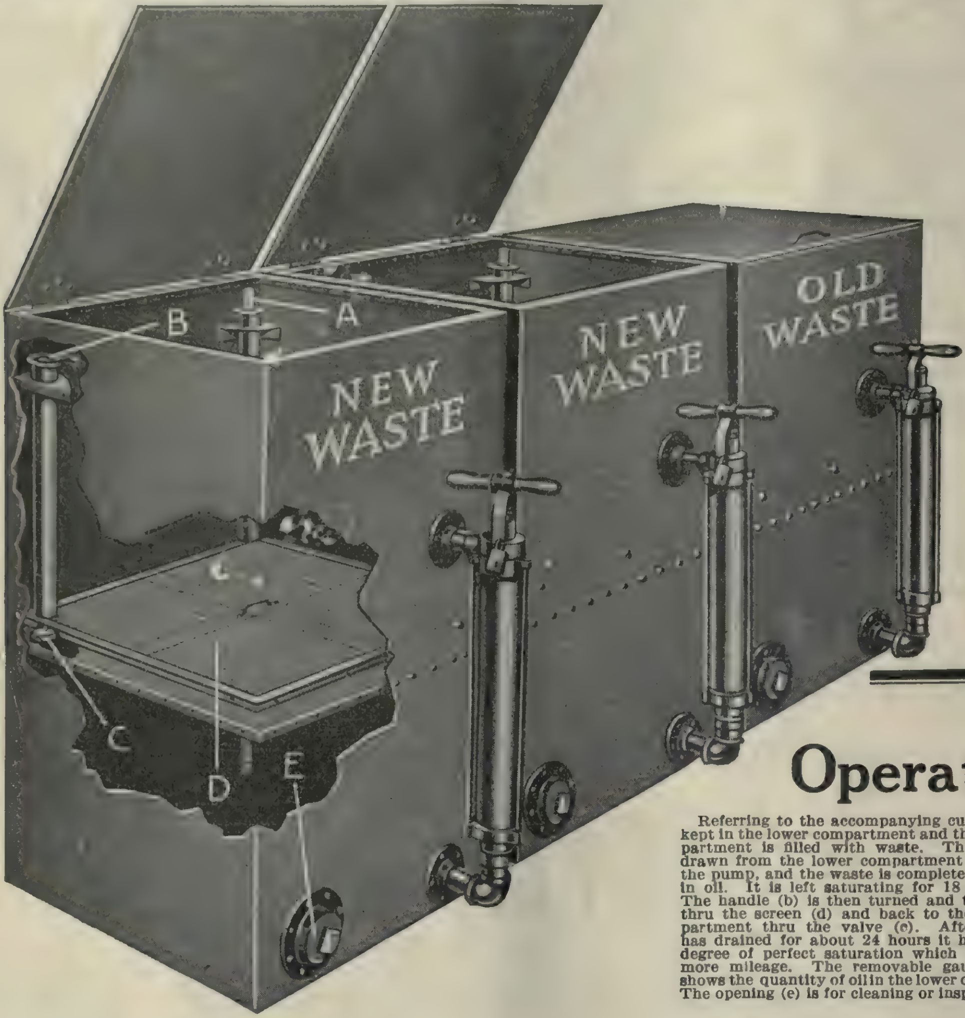
Atlanta
Chicago
San Francisco
Louisville

HK WALKOVER COPYRIGHTED

Greatly Increased Mileage from each Journal Box Packing



Operation

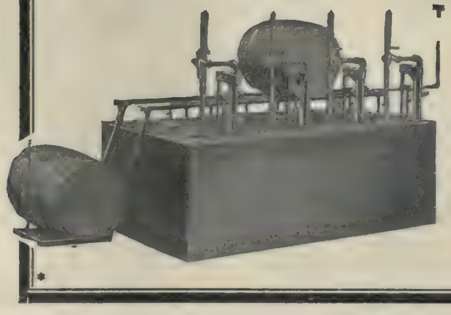
Referring to the accompanying cut. The oil is kept in the lower compartment and the upper compartment is filled with waste. The oil is then drawn from the lower compartment by means of the pump, and the waste is completely submerged in oil. It is left saturating for 18 or 24 hours. The handle (b) is then turned and the oil drains thru the screen (d) and back to the lower compartment thru the valve (c). After the waste has drained for about 24 hours it has reached a degree of perfect saturation which means 100% more mileage. The removable gauge stick (a) shows the quantity of oil in the lower compartment. The opening (e) is for cleaning or inspection.

By using the Milwaukee Waste Saturation System

you can avoid the troublesome and costly hot box and realize 10 to 15 thousand miles on a single journal box packing, at a substantial saving of oil.

Constant lubrication is assured by the method of saturating the waste. Thorough lubrication makes possible a saving of at least one-third on journal box maintenance.

Milwaukee Outfits Cut Your Oil and Labor Expense



We manufacture 30 different types of outfits for the economical storage and handling of such liquids as machine oils, cutting oils, kerosene, gasoline, etc. A Milwaukee Outfit will save you from 5 to 10 gallons of liquid on every barrel you use.

Write for our catalog of complete oil storage systems for Railways.

Milwaukee Tank Works
Milwaukee, Wisconsin

DURADUCT

(Reg. U. S. Patent Office)

Conduit Keeps Your Wiring Insulation Intact

WHEN metal conduit is used, there are few nastier jobs in car maintenance than hunting down the exact spot of a short circuit in car wiring.

Yet the cause is usually simple enough—burrs and sharp edges that ruin the insulation before you have even begun to use the wire!

With *Duraduct*—the flexible conduit with a roller-bearing runway—such damage is impossible.

The wiring *goes* in right and *stays* in right.

DURADUCT

Avoids Ruined Insulation and costly Shorts

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS • PAWTUCKET • R.I.
A.HALL BERRY • GENERAL SALES AGENT
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WENDELL & MAC DUFFIE CO., 61 Broadway, New York City
Distributors for all foreign countries except Canada
Northern Electric Company, LIMITED Distributors for Canada

Hot Box Accidents Must Go

COSMIC
METAL BEARINGS

Prevent Hot Boxes—Eliminate Babbitting

If we fail to eliminate your Bearing Troubles, no matter how chronic, we make no charge.

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals.

They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication does not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

COSMIC METAL COMPANY

420 Walnut Street, Philadelphia

You may want this man here — BUT — We need him "over there"

You Can Help Us Get Him

You might think it something of a sacrifice to deliberately talk with one of your best truck drivers and tactfully urge him to go to France to drive for the Y.M.C.A.—and it would be a sacrifice. But it wouldn't be much compared to that of the army boys who have to depend on Y.M.C.A. truck drivers for what little they can get of home comforts—would it?

The Y. M. C. A. in France Needs 75 Truck Drivers and 25 Automobile Mechanics

every month. And you can help us get them.

We can take only men who are over 37 years old and are not in Class 1 of the draft. The men we want are hard to get at directly.

Will you call the drivers and mechanics in your employ—or whom you know—into a meeting—explain the situation to them—the great need for their service—the great and honorable service they can render—and then put us in touch with the men who may be willing to undertake this great service?

The Y. M. C. A. is doing a great big work in France—it is helping our fighting men to keep in fighting trim.

One of its greatest needs is adequate transport facilities. Y. M. C. A. service for nearly two million men requires a *lot* of transportation work.

We have to move our goods and keep them moving—from ships to warehouses, to canteens, and to points behind—*and on*—the fighting lines.

We have the goods and the trucks. We need the *men* to man those trucks and keep them going.

You business men—employers—executives of industrial works—can do more than any one else to get those men for us.

Will you do it?

Fill in the Coupon—Get full data

And then use your powerful influence to help us get these men. Next to going yourself its one of the finest and most helpful pieces of war service you can render.

Ed M. Willis,
Y. M. C. A., 347 Madison Ave., New York.

It may be possible for me to get recruits for Y.M.C.A. truck service in France. Please send me full information regarding that service.

Signature..

Street and No..

Town and State..

Babbitt and Bearings

More-Jones armature babbitt metal is unsurpassed for toughness and ability to withstand high temperatures. It will remelt over and over, maintaining practically the same physical properties unimpaired.

The mileage records made by More-Jones Armature Babbitt Metal prove it the most economical metal you can use. It stands to reason that a specialty product like More-Jones Armature Babbitt must be superior to ordinary babbitts.

Give us an opportunity to show what it can do for you.

All that the best material, expert foundry practice and careful laboratory research and control can do to insure long, dependable service are to be found in More-Jones "Tiger" Bronze Axle and Armature Bearings.

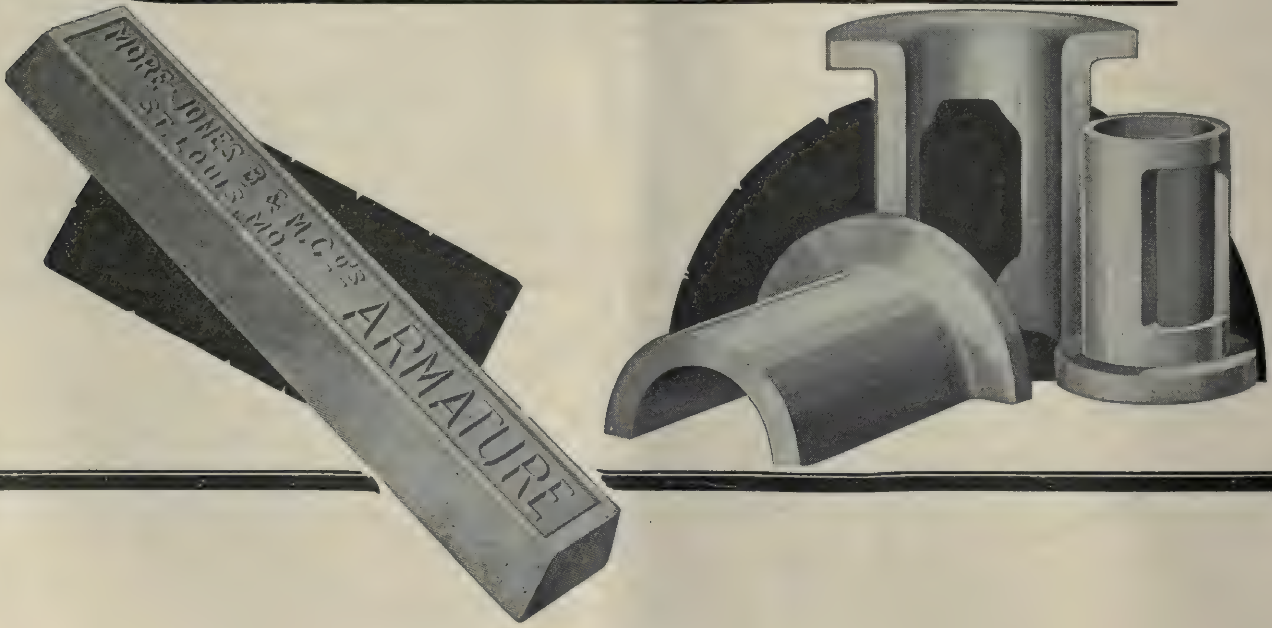
In the selection of material, in the mixing and melting of alloys under proper conditions, in the methods of casting, we put service plus into "Tiger" Bronze Bearings.

Their exceptional strength, toughness and anti-frictional qualities have achieved for them the most notable record for success in this field.

More-Jones Brass & Metal Co.

3134 No. Broadway, St. Louis, U. S. A.

Further information and prices on application.



Economy, Reliability, Efficiency

TURBOGEAR
FAST PATENTS

Line Shaft Drive for Railway Repair Shops

Turbo-Gear Steps Up or Steps Down Speed

The arrows show the Turbo-Gear

Standard Turbo-Gear Motor Line Shaft Drive, 100 H. P. Gear. Speed Reduction 730 to 122 R. P. M.

Turbo-Gear drives mean

1. Higher efficiency.
2. Less floor space required.
3. Greater simplicity.
4. High and low speed shafts in the same straight line.
5. No side strain on motor shafts or bearings.
6. No attention or adjustment needed after being properly installed.
7. Absolute reliability.

WRITE FOR BULLETIN 100.

The Poole Engineering & Machine Company

Manufacturers of Gears and Power Transmission Machinery Since 1843

Baltimore **Maryland, U. S. A.**

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Here are the famous

Columbia Electric Hoists

shown contributing to repair shop economy.

Why economy?

Because they are made according to a special design of great simplicity and efficiency.

Will elevate a 50-ton car 6 feet in five minutes, *without swaying.*

Any old traction motor will run them.

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
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W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd.
Toronto, Ont.

Columbia Repair Shop Specialties and Car Equipment Include

TOOLS

Armature and axle straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil tapping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

Columbia Repair Shop Specialties and Car Equipment Include

CAR EQUIPMENT

Armature and axle bearings
Armature and field coils
Bearings (axle and armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

Way out at San Antonio they're Boyerized

The city of the Alamo is a long, long way from Springfield, Mass.

But the story of a good product travels far and is heeded by the wise ones.

Which explains why the Public Service Company of San Antonio uses so many Boyerized case-hardened pins and bushings.

No matter where you are located, we are ready to serve you with these truck and brake trouble eliminators.

ELECTRIC RAILWAY SUPPLIES

Bemis Car Truck Company

SPRINGFIELD MASS

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

The
QUALITY
MARK

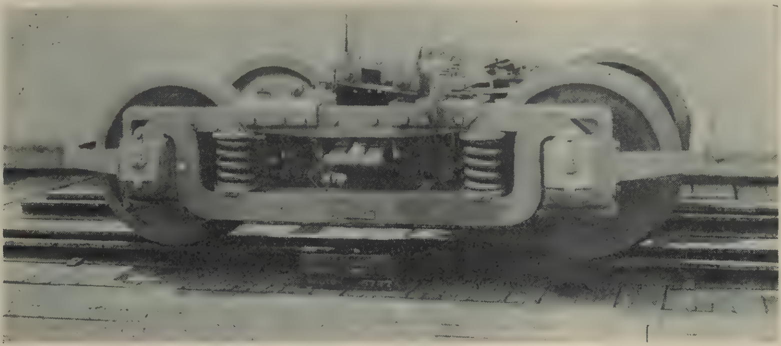
The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio

Steel for Service

Modern

electric railway equipment requires, to insure ultimate economy in expenditure, choice of the best designs and the best materials

This car of the Cleveland, Southwestern & Columbus Railway is mounted on Brill 27MCB-3-X trucks with the latest swing bolsters and is carried on 37-in. solid rolled steel wheels and AERA-EC axles made by Carnegie Steel Company.



The works of the Carnegie Steel Company are pioneers in the manufacture of

Rolled Wheels and Steel Axles

That long experience is the user's best guarantee for perfection of materials without which very best designs may not prove entirely satisfactory.

Carnegie Steel Company

General Offices—Pittsburgh, Pa.

957

ELECTRICAL WIRES
AND CABLES

IRON, STEEL AND
COPPER WIRE ROPE
AND WIRE

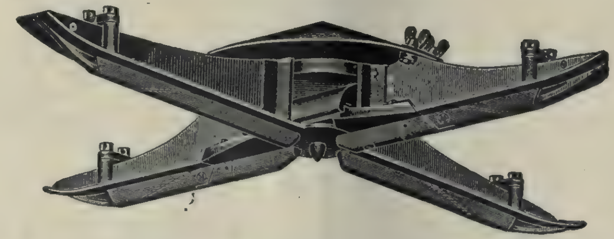
TROLLEY WIRE INSULATED WIRES TRANSMISSION WIRE

Galvanized E. B. B. and B. B. Telephone and Hard Drawn Copper for Telephone Lines. Bronze and Galvanized Steel Contact Wire. Galvanized Strand for Guys, Span Wire and Messengers.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY

Agencies and Branches: New York Boston Chicago Philadelphia Pittsburgh Cleveland Atlanta San Francisco Los Angeles Seattle Portland, Ore.

Stronger—Yet 25% Lighter



The Anderson Sheet Steel Insulated Crossing

Made of the best homogeneous sheet steel and fitted with renewable insulated runways to insure long life under heavy service.

A big improvement over ordinary types. A money saver under all conditions. Install them on your crossings.

We make a full line of high-grade line materials.
Write for Catalog No. 8 giving full description.

ALBERT & J. M. ANDERSON MANUFACTURING CO.
289-293 A STREET, BOSTON, MASS., U. S. A.

NEW YORK
135 Broadway

PHILADELPHIA
429 Real Estate Trust Bldg.

CHICAGO
105 S. Dearborn St.
LONDON, E. C., 48 Milton St.

CYPRESS

"THE WOOD ETERNAL"

is NOT the *Best Lumber for ALL Railway Purposes.* For certain specific applications, however, in which railways have large lumber requirements, the use of all-heart Cypress develops very large *economies* in *maintenance costs.* For example, the Railway Signal Association in its standard specifications for wood to be used for "Trunking and Capping" has always placed all-heart Cypress among the first choices in the list of suitable woods.

The Railway Signal Association makes its recommendations as a result of definite *knowledge* of the subject, and its membership includes many able men who are Cypress enthusiasts. We gladly refer all doubters as to Cypress superiority to any well-posted railway engineer who has had experience with Cypress, "the wood eternal."

The same conditions of service which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

FENCING

and similar purposes where the material is exposed constantly to the weather, and where it is consequently essential that it shall be highly capable of *resistance to decay.* That is the great and particular value of Cypress—it is *highly resistant to decay.* (All-heart especially.)

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it in connection with "Trunking and Capping," there will be a lot more all-heart Cypress used in railway service—*to the very great economy of the companies using it.*

Our data is at your service.

SOUTHERN CYPRESS MFRS' ASS'N

1265 Hibernia Bank Building, New Orleans, La., or
1265 Heard National Bank Building, Jacksonville, Fla.

Of Course

Your rule may be
"Touch no live wires"

But

Have you never known a "dead" wire to be

"LIVE"

"RIMCO"

Rubber Insulated Pliers

SAFEGUARD YOUR MEN

There is always this possibility of a wire being "live." But the mere fact that "dead" lines are usually "dead" causes linemen and other electrical men to become careless and leave off their rubber gloves.

But if you insist upon the use of "RIMCO" you may rest assured that your men are protected, for "RIMCO" pliers are tested and guaranteed by the Electrical Testing Laboratories of New York to 10,000 volts.

Let us explain their many other advantages in detail.

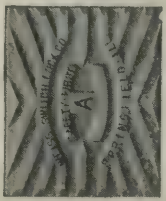
Rubber Insulated Metals Corporation

Plainfield, New Jersey

SALES AGENTS—Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia. National Railway Appliance Co., 50 E. 42nd St., N. Y. City. Canadian Agent: Lyman Tube & Supply Co., Ltd., Montreal, Toronto and Winnipeg.

Exclusive Export Agents
International
Western Electric Company
INCORPORATED

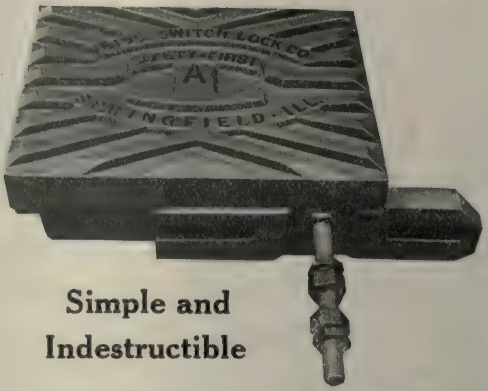
WEISS SWITCH LOCK



Ends All Switch Troubles

Here is a positive railway switch point lock that locks both right and left, locking the switch so tightly that there is no chance of splitting it. Once installed it absolutely ends all switch troubles, for it is *waterproof, non-freezable, mud-proof and sandproof.* It never requires attention, it is safe, dependable and practically indestructible.

Watertight
Non-Freezable
Mud-Proof
Sand-Proof



Simple and Indestructible

This switch lock is exceedingly simple in design, having very few parts, none of which are complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through, to prevent the entrance of water or dirt.

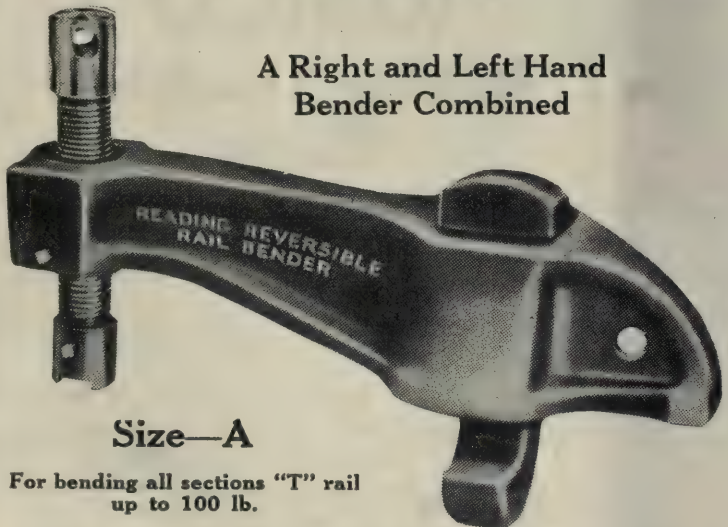
The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.

The Reading Reversible Rail Bender

A Right and Left Hand Bender Combined



Size—A

For bending all sections "T" rail up to 100 lb.

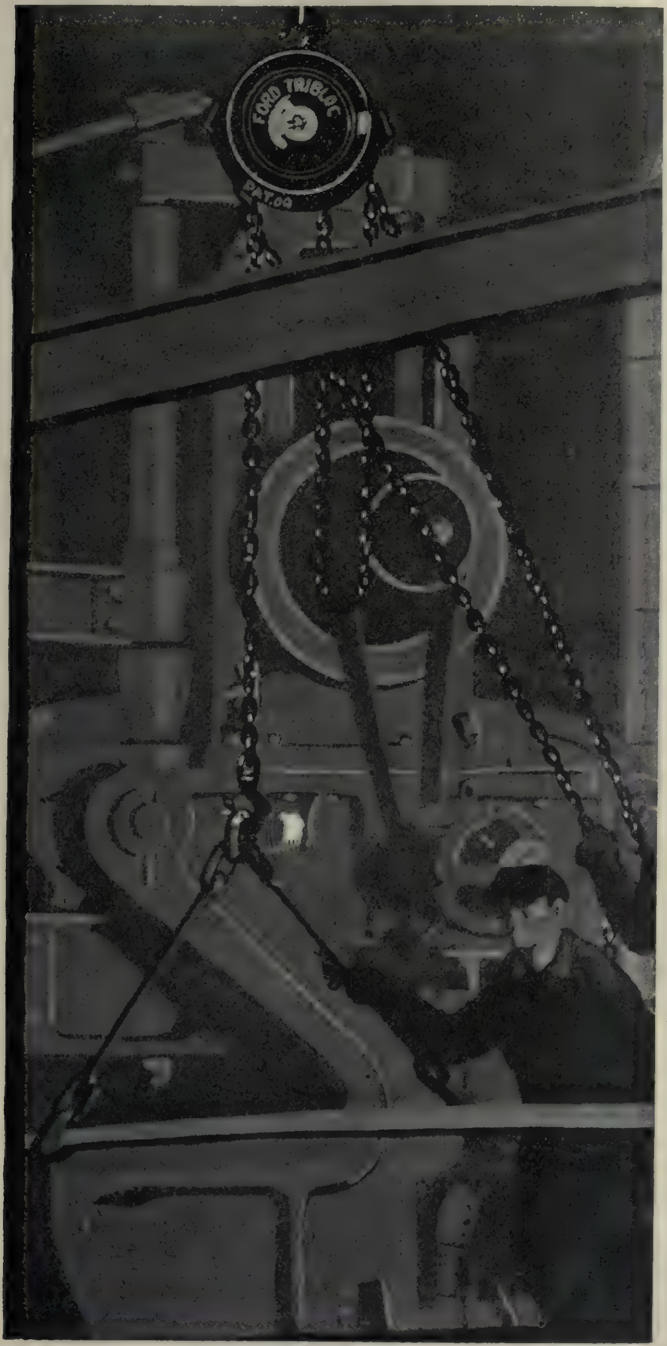
It has a greater working radius than any other Rail Bender on the market. It will bend a Rail nine inches from the end, either right or left without adding another section of Rail and Splice Bar.

You can make your own Guard Rails. You can stock your Rails at the switch points, without removing points. You can take out your surface kinks.

You can save money by letting us explain further the many uses of our Right and Left Hand Bender.

THE READING SPECIALTIES COMPANY
Reading, Penn.

FORD TRIBLOC



Easy Operation at Any Angle

Don't let the progress of the work lag because of a hoist's shortcomings. There is no reason why the hoist operator should get in the way of the machine operator if a Ford Tribloc Chain Hoist is used.

A Ford Tribloc can be easily, safely and efficiently operated at any angle as a result of the patented anti-gagging LOOP Hand Chain GUIDE. No other hoist quite like the Ford—ask why.

Ford Chain Block & Mfg. Company
Second and Diamond Streets, Philadelphia, Pa. 2138-D

ALLIED Export Department ALLIED CONSTRUCTION MACHINERY CORPORATION 120 Broadway New York, U.S.A. ALLIED

NOARK
RENEWABLE FUSES

The Even Ferrule Insures
A *Perfect* Contact

LAY a straight edge alongside any ferrule contact "Noark" Renewable Fuse and hold them to the light. The evenness of both parts of the ferrule is immediately apparent.

In the "Noark" Renewable Fuse not only is perfect ferrule contact with the clip assured, but also proper connection between the ferrule and the link, for the end of the cap makes a wiping contact with the link.

These are only two of the advantages in "Noark" Renewable Fuses. There are so many out-of-the-ordinary features about this new line that we suggest you ask your jobber or the nearest Johns-Manville house electrical department to show you samples.

H. W. JOHNS-MANVILLE CO.
New York City
10 *Factories—Branches in 63 Large Cities*

J-P Co. REG. IN U.S. NOARK PAT. OFF. FUSE

Manufactured by the Johns-Pratt Co., Hartford, Conn., H.W. Johns-Manville Co., Sole Selling Agents

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Johns-Manville

STAR LATHES

—the accuracy and rigidity of a big Lathe

—the floor space of a small one

For repair work and light manufacturing Star Lathes are as trustworthy as heavier, more expensive lathes.

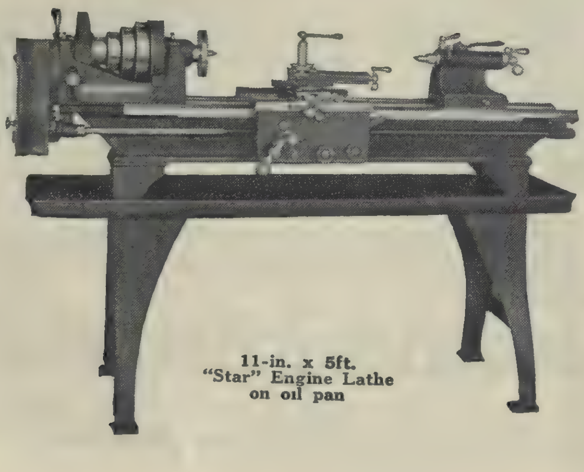
Star Lathes are built by an organization that has worked for 35 years on "accuracy at moderate cost."

If your floor space is valuable provide Star Lathes and solve your space problems.

As an additional advantage you will have secured a lathe with extreme simplicity of operation—a valuable asset, especially in many repair shops where the highly skilled labor is not always available.

Write us for further particulars.

The Seneca Falls Mfg. Co., Inc.
385 Fall Street
Seneca Falls, New York



11-in. x 5ft.
"Star" Engine Lathe
on oil pan

Make Your Present Equipment

Serve Your Purpose LONGER!

It is a saving for you and for the Nation. In the aggregate, such economy is far-reaching in its effect as a "win the war" measure.

If You Must Have New Equipment

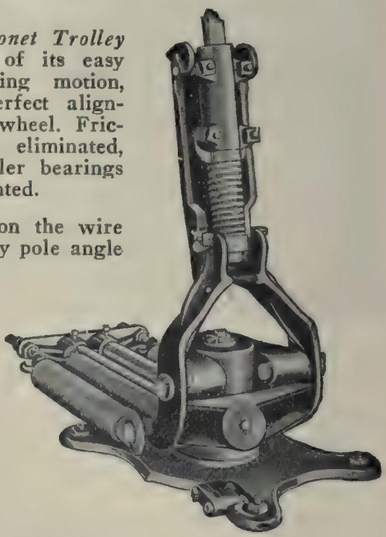
Consider BAYONET TROLLEY EQUIPMENT — Competitive tests have demonstrated its superiority.

Consider "Bayonet" because it affords longer service—a greater saving in power—is more convenient. These are potent reasons in its favor—but

Use your present equipment as long as you possibly can. When you do purchase equipment—get the kind that *lasts*—"Bayonet."

The *Patented Bayonet Trolley Base,* on account of its easy swivel and rotating motion, assures you of perfect alignment of the trolley wheel. Friction is practically eliminated, because of the roller bearings on which it is mounted.

Uniform pressure on the wire is maintained at any pole angle at all times.



Catalog sent upon request.

Bayonet Trolley Harp Co.
Springfield, Ohio

NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

MACHINE TOOLS

For Electric Railway Repair Shops

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

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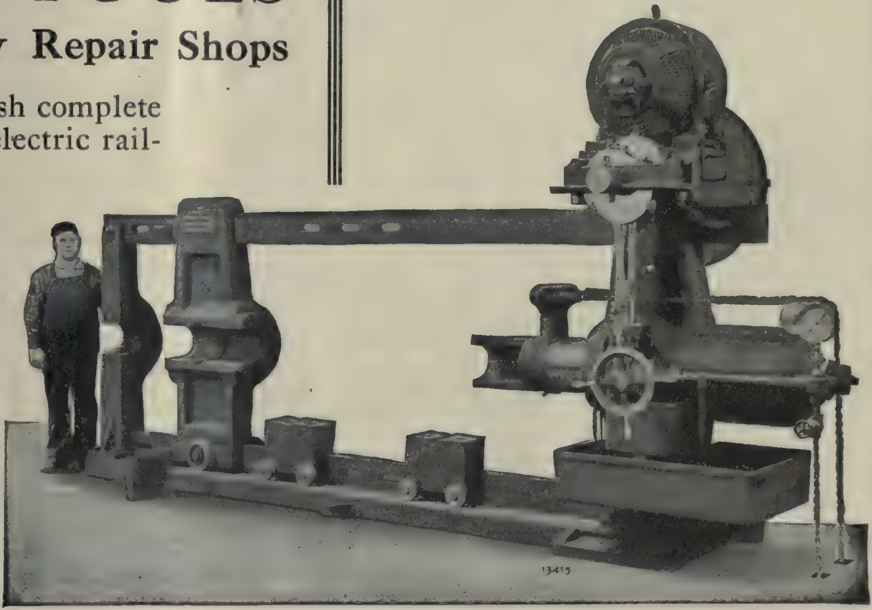

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Every piece of idle equipment, unnecessary material or scrap represents WASTE!

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The development of the Van Dorn interchangeable M. C. B. coupler head makes it possible to change your interurban cars into the M. C. B. class with little trouble and expense.

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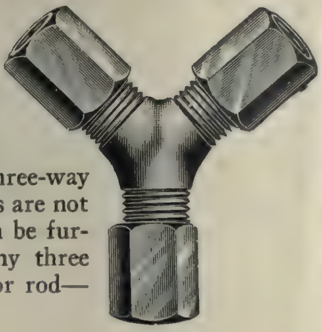

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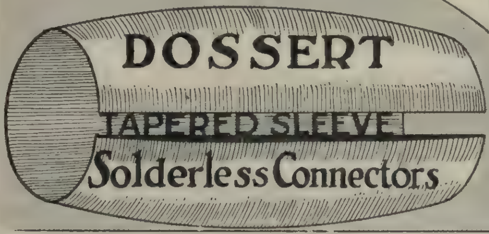

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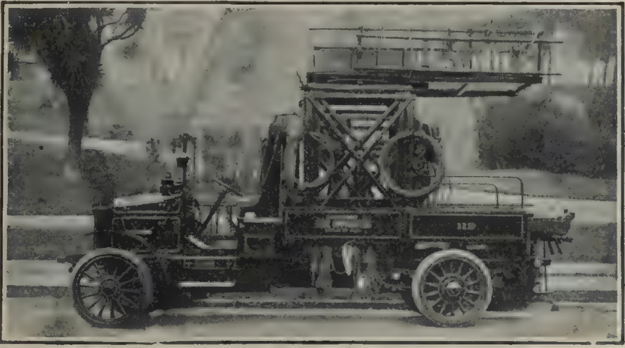

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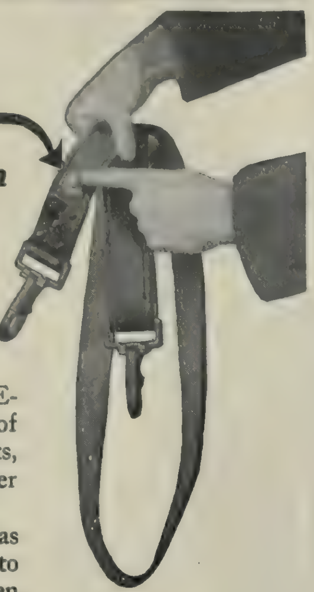

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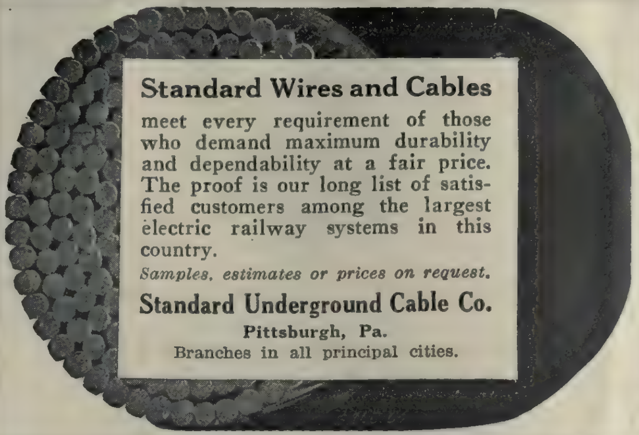

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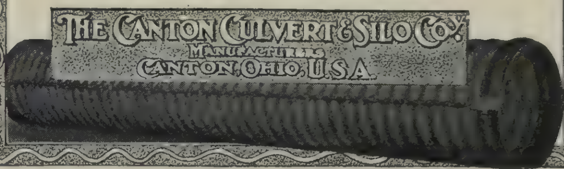
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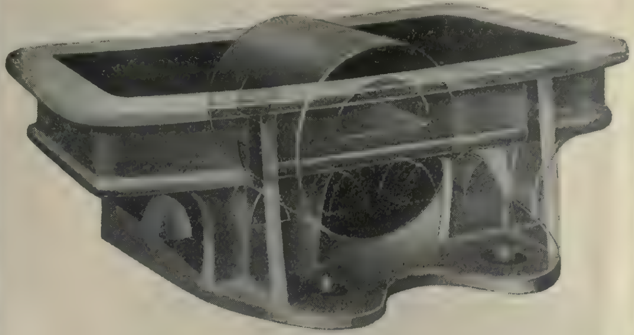

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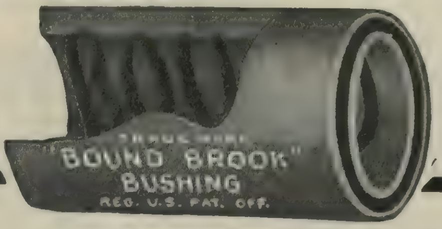

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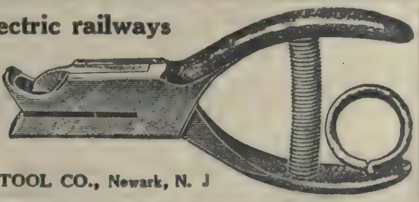

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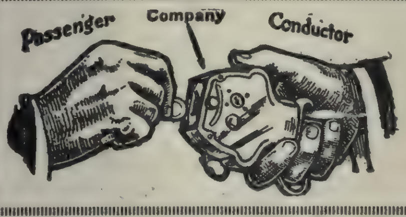

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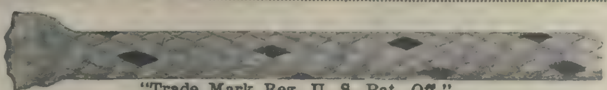

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657 Leader-News Bldg., Cleveland.
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BARN foreman, experienced in modern methods of inspection and maintenance of car equipment. Reply in own handwriting, stating age, nationality, experiece and salary expected. P-261, Elec. Ry. Journal, Phila.

LINE foreman wanted for 35-mile road in city of 60,000 in Middle West. Give experience and salary expected. P-265, Elec. Ry. Journal, Cleveland.

ROADMASTER wanted for sixty mile road, give all information, including salaries earned and expected. Mobile Light and Railaroad Company, Mobile, Alabama.

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AUDITOR, secretary or treasurer of interurban road; 15 years' experience; fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. PW-247, Elec. Ry. Journal, Chicago.

ELECTRIC railway engineer, 31, class IV draft; general experience as M. of W. and electrical executive, desires position as chief engineer or assistant to busy executive. References. PW-256, Elec. Ry. Journal.

ENERGETIC, ambitious, 38 years old man, 15 years' experience in street railway transportation with large company. Thoroughly familiar with every detail of the department, including charting traffic, making and adjusting schedules and handling men, desires position as transportation superintendent. My record with present employer is proof of my ability. PW-258, Elec. Ry. Journal, Cleveland.

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Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Alloys, Steel and Iron (See also Bearings and Bearing Metals)
Titanium Alloy Mfg. Co.

Anchors, Guy
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Brill Co., The J. G.

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Columbia W. W. & M. I. Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices
Columbia M. W. & I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.
Nichols-Lintern Co.

Batteries, Storage
Electric Storage Battery Co.

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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Cosmic Metal Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Holden & White, Inc.
Stucki Co., A.

Bearings, Oilless, Graphite Bronze and Wood
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Ball
Gurney Ball Bearing Co.
S K F Ball Bearing Co.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Reading Specialties Co.
Zelnicker, Walter A., Supply Co., Inc.

Boilers
Babcock & Wilcox Co.

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Johns-Manville Co., H. W.

Boiler Coverings
Johns-Manville Co., H. W.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

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Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
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Safety Car Devices Co.
Westinghouse Trac. B. Co.

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Beaumont Co., R. H.

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Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Oil-less Bearing Co.

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

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American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
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Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Ohio Brass Co.
Remmele & Maier.
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Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
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General Electric Co.
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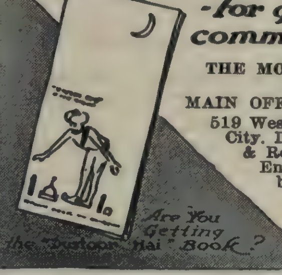
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Page Steel & Wire Co.

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Cleveland Fare Box Co.
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Root Spring Scraper Co.
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Standard Steel Works Co.

Frogs, Track. (See Track Work)

Furnaces. (See Stokers)

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gages, Oil and Water
Ohio Brass Co.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Poole Engineering & Machine Co.
Tool Steel Gear & Pinion Co.

Gears, Reduction
Poole Engineering & Machine Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bell and Gongs)

Graphite
Morgan Crucible Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists and Lifts
Beaumont Co., R. H.
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic and Fire
Johns-Manville Co., H. W.
Westinghouse Traction Brake Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

Inspection
Electrical Testing Lab's.

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Pape and Tape
Freydberg Bros., Inc.
General Electric Co.
Irvington Varnish & Insulator Co.
Johns-Manville Co., H. W.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & M. Co.

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Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insulated Wire Cutters
Rubber Insulated Metals Corp.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

Joints, Rail
Carnegie Steel Co.
Reading Specialties Co
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Junction Boxes
Johns-Manville Co., H. W.
Standard Underground Cable Co.

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Electrical Testing Lab's.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lathes
Seneca Falls Mfg. Co.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lighting Regulators, Car
Holden & White, Inc.

Lights, Portable Carbide
Milburn Co., The Alex

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Dossert & Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers
Galena-Signal Oil Co.

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Galena-Signal Oil Co.

Lumber. (See Poles, Ties, etc.)

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co

Machine Work
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Mats
Johns-Manville Co., H. W.

Meters, Car, Watt-Hour
Economy Electric Devices Co.

Meters. (See Instruments)
Electric Service Supplies Co.
Wood Co., Chas. N.

Mica
Schoonmaker Co., A. O.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Motors, Electric
Westinghouse Elec. & M. Co.

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Lincoln Bonding Co.

Motor Leads

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Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

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Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)

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Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Packing Rings
Johns-Manville Co., H. W.

Paints and Varnishes. (Insulating)
Irvington Varnish & Insulator Co.
Mitchell-Rand Mfg. Co.

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Johns-Manville Co., H. W.

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National Ry. Appliance Co

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Electric Service Supplies Co.
Ohio Brass Co.

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Columbia M. W. & M. I. Co.
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Power Specialty Co.
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Westinghouse Traction Brake Co.

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Electric Service Supplies Co.
National Railway Appliance Co.
Rubber Insulated Metals Corp.

Pole Reinforcing
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

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Lindsley Bros. Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber
Carney & Co., B. J.
Lindsley Bros. Co.
Southern Cypress Mfgrs. Assn.
White Marble Lime Co.

Poles, Trolley
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
National Tube Co.

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Arthur Power-Saving Recorder Co.
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Power Transmission Machinery
Poole Engineering & Machine Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Electric & Mfg. Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rail Grinders. (See Grinders)

Rail Welding. (See Brazing and Welding Processes)

Rails, Relaying
Zelnicker, Walter A., Supply Co., Inc.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Arthur Power-Saving Recorder Co.

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Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.
Standard Register Co.

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American Steel & Wire Co.

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Columbia M. W. & M. I. Co.
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General Electric Co.
Westinghouse Elec. & M. Co.

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Roofing, Car
Johns-Manville Co., H. W.

Sanders, Track
Brill Co., The J. G.
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Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash Metal, Car Window
Hale & Kilburn Corp.

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Hale & Kilburn Corp.
St. Louis Car Co.

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Brill Co., The J. G.

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Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

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Nichols-Lintern Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

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(See Brake Adjusters)

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Nuttall Co., R. D.

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McGuire-Cummings Mfg. Co.
Remmele & Maier

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Speed Indicators
Johns-Manville Co., H. W.

Speed Transformers
Poole Engineering & Machine Co.

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American Steel & Wire Co.

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Johns-Manville Co., H. W.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

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Standard Steel Works Co.

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Brill Co., The J. G.
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St. Louis Car Co.

Steps, Car
American Mason Safety Tread Co.
Universal Safety Tread Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

Storage Batteries. (See Batteries, Storage)

Strand
Roebling Son's Co., J. A.

Straps, Car, Sanitary
Holden & White, Inc.

Structural Iron. (See Bridges)

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)

Switches, Lock
Weiss Switch Lock Co.

Switch Stands
Ramapo Iron Works.

Switches, Track. (See Track Special Work)

Switches and Switchboards
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Westinghouse Elec. & M. Co.

Tampers, Tie
Ingersoll-Rand Co.

Tanks, Oil Storage
Milwaukee Tank Works

Tapes and Cloths. (See Insulating Cloths, Pape and Tape)

Telephones and Parts
Electric Service Supplies Co.

Terminals, Cable
Standard Underground Cable Co.

Testing Commercial and Electrical
Elec'l Testing Laboratories.

Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties, Posts, etc.)

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American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Klein & Sons, Mathias
Railway Track-work Co.

Torches, Acetylene. (See Cutting Apparatus)

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American Bridge Co.
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Ramapo Iron Works.
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American Bridge Co.

Transfers. (See Tickets)
Archbold-Brady Co.

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Westinghouse Elec. & M. Co.

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American Mason Safety Tread Co.
Universal Safety Tread Co.

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Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Holden & White, Inc.
Miller Trolley Shoe Co.

Trolleys and Trolley Systems
Ford Chain Block & Mfg. Co.

Trolley Shoes
Holden & White, Inc.

Trolley Wheels. (See Wheels, Trolley)

Trolley Wire
Roebling Son's Co., John A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel
National Tube Co.

Turbines, Steam
General Electric Co.
Westinghouse Elec. & M. Co.

Turnstiles
Perey Mfg. Co., Inc.

Vacuum Impregnation
Allis-Chalmers Mfg. Co.

Valves
Ohio Brass Co
Westinghouse Traction Brake Co.

Varnishes. (See Paints, etc.)

Ventilators, Car
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St Louis Car Co.

Voltmeters. (See Instruments)

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Wheel Presses (See Machine Tools)

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Wheels, Car, Steel and Steel Tired
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

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Bayonet Trolley Harp Co.
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Columbia M. W. & M. I. Co.
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Eureka Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., John A.

Wires and Cables
Aluminum Co. of America.
American Elec'l Works.
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Kerite Insulated Wire & Cable Co
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A battleship with blowholes in its armor is not very dependable; nor a rail in which structure-weakening and life-shortening impurities have been allowed to remain.

The dependability—and consequently the durability—of Titanium-Treated rail is due to the fact that the metal is so thoroughly cleansed of all harmful elements that the finished rail is a uniform product of longer life and greater safety

The low cost of

TITANIUM TREATMENT

$2.00 per ton, compared with the cost of rail, makes its use for any important service obvious.

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

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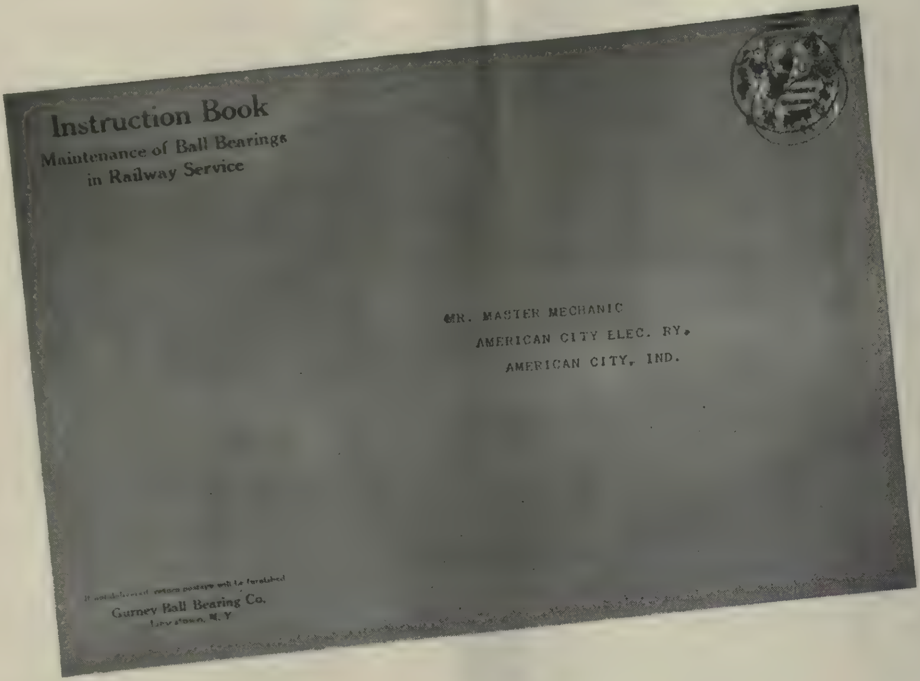
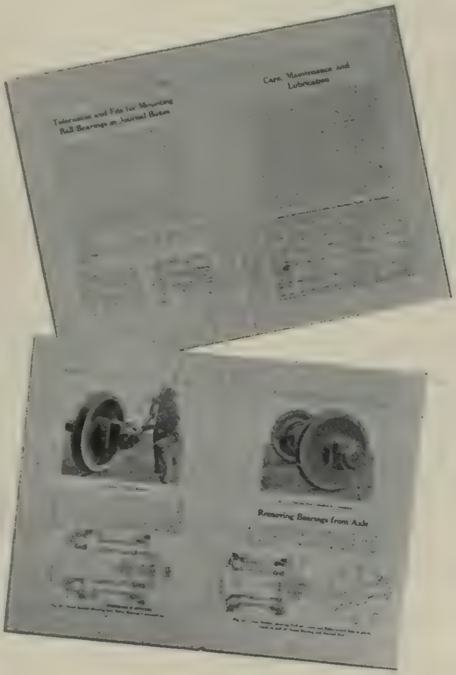


Instruction Book
Maintenance of Ball Bearings
in Railway Service

MR. MASTER MECHANIC
AMERICAN CITY ELEC. RY.
AMERICAN CITY, IND.

If undelivered return postage will be furnished
Gurney Ball Bearing Co.
Jamestown, N. Y.



Tolerances and Fits for Mounting Ball Bearings in Journal Boxes

Care, Maintenance and Lubrication

Removing Bearings from Axle

WE EXPECT to mail a copy of this Instruction Book to the Master Mechanic of every electric railway in the United States.

These books will be mailed about the time this issue of Electric Railway Journal reaches you.

This is not an advertising book, but a straight out-and-out Instruction Book describing the principal types of mountings used, and explaining how to press on and pull off bearings, how and when to lubricate, and general precautions to be observed.

If you are not now operating ball bearing cars you probably will be soon.

Don't let this book get by you

Gurney Ball Bearing Co.
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Jamestown, N. Y.

OUTSIDE-HUNG, DOUBLE-MOTOR TRUCK WITH GRADUATED SPRING SYSTEM

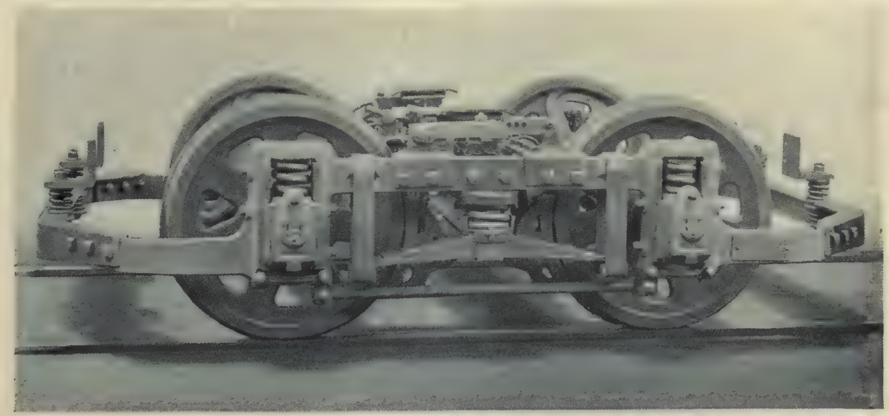
BRILL

TRUCKS of the 76-E type have the same easy riding qualities as the 39-E Single-motor type because the spring arrangement is identical. It used to be that to get good spring action, a car must be loaded to its full capacity; but now, with the Graduated Spring System, there is just as smooth running under light loads as under heavy.

Since the early years of electric traction, when solid forged side frames took their successful place in truck construction, there has been no contribution to the truck end of the industry that comes anywhere near equalling the importance of the Graduated Spring System and its accompanying producer of easy spring motion, the Bolster Guide.

In these times when so much attention is being given to gaining the good will of the public, the Graduated Spring System and Bolster Guide are doing a real part by distinctly improving the comfort of riding—making car riding more comfortable than automobile riding.

Bulletin 225 fully describes the 76-E Truck.



THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

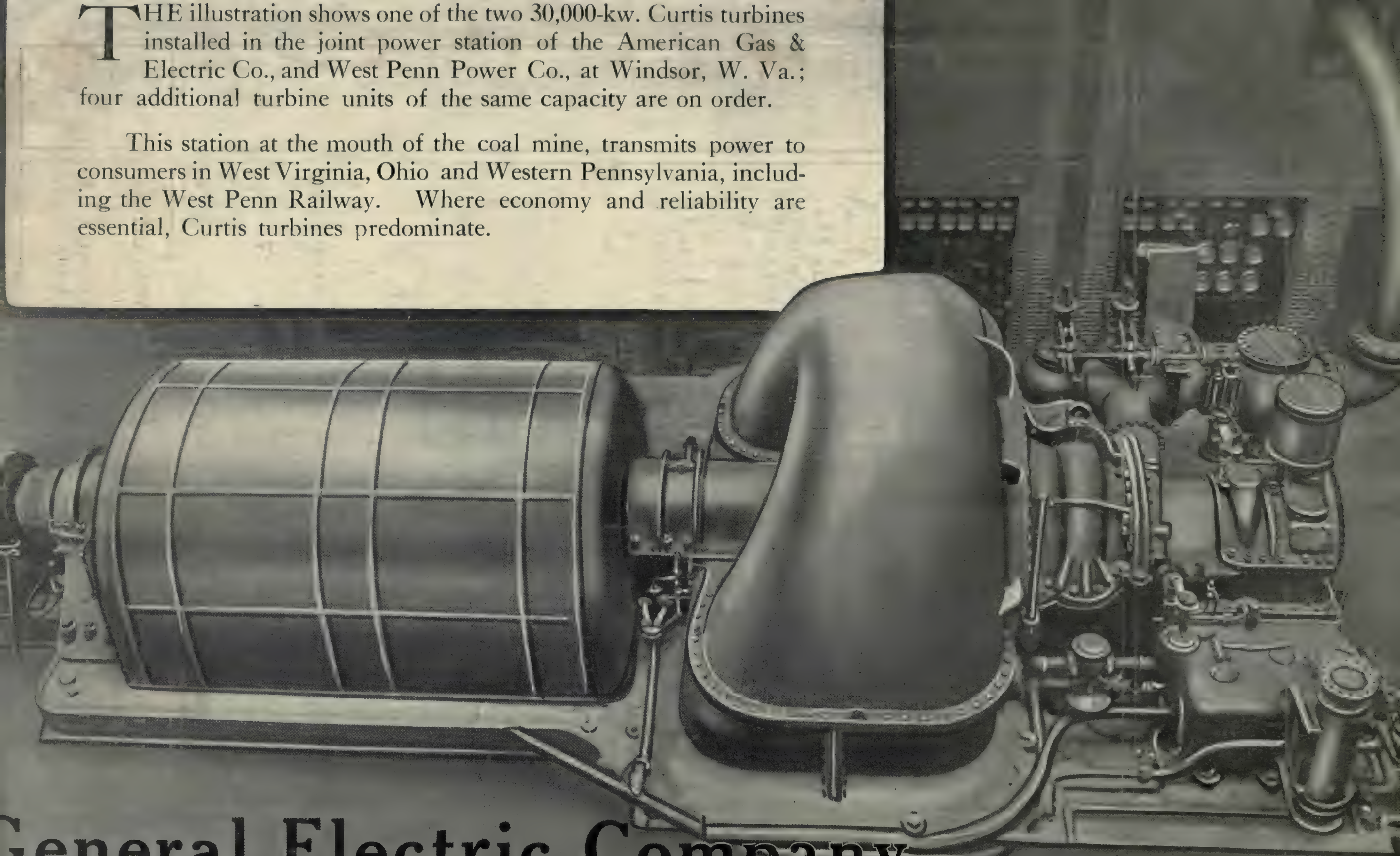
AMERICAN CAR COMPANY
ST. LOUIS, MO.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

THE illustration shows one of the two 30,000-kw. Curtis turbines installed in the joint power station of the American Gas & Electric Co., and West Penn Power Co., at Windsor, W. Va.; four additional turbine units of the same capacity are on order.

This station at the mouth of the coal mine, transmits power to consumers in West Virginia, Ohio and Western Pennsylvania, including the West Penn Railway. Where economy and reliability are essential, Curtis turbines predominate.



General Electric Company

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ELECTRIC RAILWAY JOURNAL

October 26, 1918

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Unloading Cars with one, two, three or more Scoop Conveyors
Loading Cars from Storage pile with one, two or more Scoop Conveyors
For Retail Coal Yards the Scoop Conveyor can be provided with a dust hopper fitted with removable screens
Unloading Barge with two or more Scoop Conveyors
BOX
TILE
BAG
BRICK
PORTABLE MACHINERY CO. INC.
PASSAIC, N.J.
Loading Cars direct from Trucks Wagons or Carts
Unloading Cars direct into Trucks, Wagons or Cars
Loading Box Car from ground or platform
A Scoop Conveyor may be placed right into the car to fill up the ends

OVER ONE THOUSAND

Users Find This Machine an Indispensable Saver of Time, Labor and Money

For rapid, clean and economic loading and unloading of cars, stacking coal, sand, ashes, and other loose material, as well as handling boxes, bags, crates and bulky packages of all kinds.

One man and the Scoop Conveyor can do the work for which you now need from 6 to 12 men. Would that help the labor question any for you?

Ask for our Literature and mention ELECTRIC RAILWAY JOURNAL

PORTABLE MACHINERY CO., Inc.
Passaic, N. J.

The Scoop Conveyo

Omaha's New Cars

The Omaha & Council Bluffs Street Railway Company design and build their own cars.

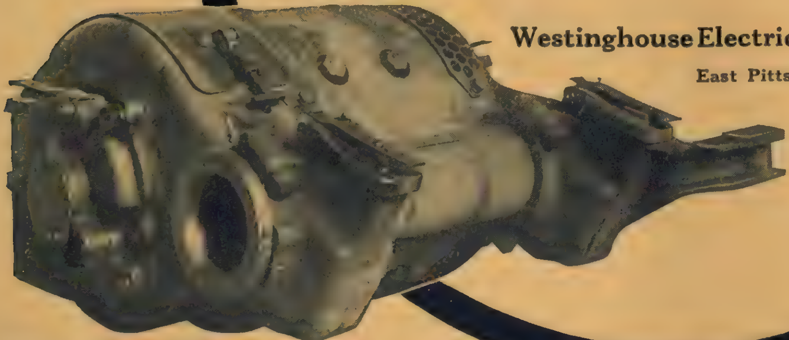
The forty, recently placed in service, parallel the latest designs in the art of car building. Each car is equipped with quadruple Westinghouse No. 506 Motors for 33-inch wheels, and are rendering satisfactory service on grades as high as 10 per cent. encountered in the regular city service.

Complete description of this modern equipment is given in the *Electric Railway Journal* of September 21, 1918.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

WESTINGHOUSE ELECTRIC



Westinghouse No. 506-C
Railway Motor

Westinghouse

Vol. 52, No. 17 New York, October 26, 1918 Pages 725 to 766

Electric Railway Journal

H. W. BLAKE, *Editor*

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Preliminary details of the one-man, two-man, prepayment and postpayment car submitted by War Board to Housing Bureau. Provides latest labor-saving and time-saving devices and is suitable for either single or two-car operation under great variety of conditions. Cars have no drop platforms and are unusually light ....Page 729

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A two-mile extension, connecting track, prepayment terminals, carhouse and new cars help haul the war workers. The new facilities cost more than $800,000..Page 734

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More Shells—Fewer Casualties

BACK of every war activity lies—coal. Ships, shells, guns, transportation. For all these we must have—coal.

The more coal, the more shells with which to destroy the machine-gun nests of our enemies—and thereby save the lives of our own boys. The larger the supply of coal—the shorter the war and fewer casualties.

Our annual output of coal has increased a hundred million tons since we went into the war, while no other nation has even been able to maintain its output during the war.

Another fifty million badly needed tons can be saved—to help shorten the war.

Save coal.

Close up the unused rooms and turn off the heat. Put on storm doors and windows—put them on early. See to it that the weather strips fit.

Don't heat your home above 68°. A higher temperature is unhealthy, anyway.

Burn wood where you can.

Keep an eye on the furnace—don't leave it all to "the man."

If you feel that one shovelful of coal won't make any difference—think of it as a shell for the boys over there.

If you find yourself burning two lights when one will do—turn one out.

You, who have bought bonds and thrift stamps, you who have given of your money for war charities, given until you have felt the pinch, you whose sons and neighbors' sons are over there, will you not give up, too, just a bit of lazy, enervating comfort to help hurry along the job those brave boys have tackled?

Save light and heat, save coal.

To learn to operate your furnace efficiently, get from your local fuel administrator a leaflet entitled "Save Coal in the Home."

UNITED STATES FUEL ADMINISTRATION

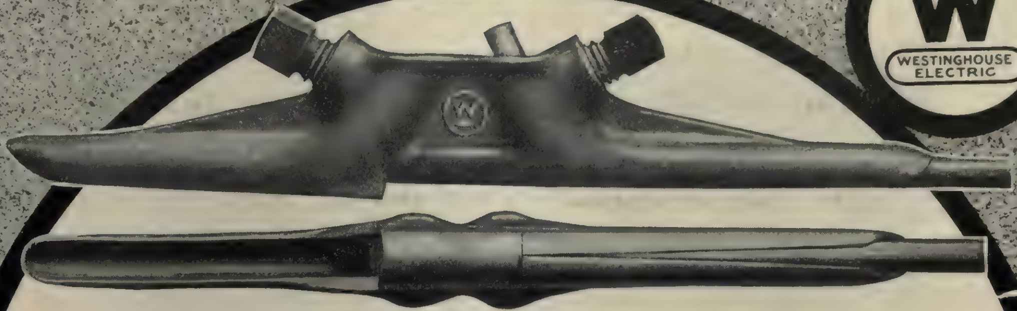
Contributed Through
Division of Advertising

United States Gov't Comm.
on Public Information

This space contributed for the Winning of the War by
WESTINGHOUSE TRACTION BRAKE CO.

Type U Trolley Wire Splicer

WESTINGHOUSE ELECTRIC

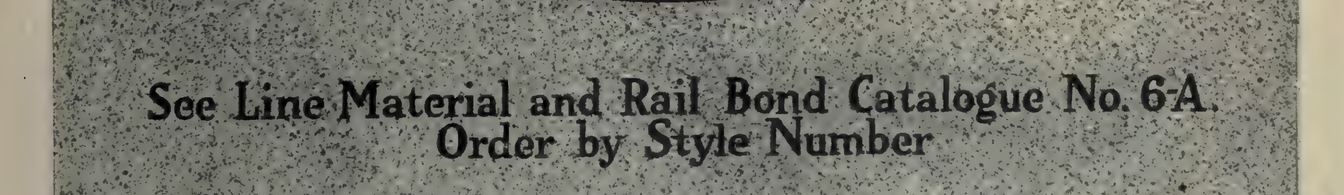


Without Boss-Length 10 inches

The Type U is an improved form of splicer similar to the Clarke, except heavier throughout. It is stronger than any trolley wires which can be connected by it. It has the same under-run as the Cleveland Trolley-Wire Splicer.

The lips are thickened on the outside where they encircle the wire, so that when clinched around the trolley wire, the thick lips fill up the space caused by the bend of the wire.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



With Boss-Length 15 inches

See Line Material and Rail Bond Catalogue No. 6-A.
Order by Style Number

Westinghouse

Platform Accidents

Can't Happen on the

Safety Car

THIS operator on a Houston car equipped with the Safety Car Control Equipment is in the best possible position to see that the passenger departs safely.

But that isn't all!

For even if he paid no attention to her, he could not possibly start the car until she had stepped into the street—

Because a car furnished with the Safety Car Control Equipment cannot be started until the step is up and the door is closed!

SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Bldg.

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

OB PRODUCTS

Quality First

O-B Trolley Catcher Works Every Time—All the Time

Every time the wheel leaves the wire the O-B Catcher stops it quickly and holds it securely. There is no "stepping-up" because the rebound is never sufficient to release the catcher.

And the O-B Catcher works all the time. Its parts are rugged and as few as is consistent with reliable operation.

It stays on the car and out of the shop.

Send for one on free trial.

Phantom View

The Ohio Brass Co., Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago
Los Angeles San Francisco

Phono-Electric is the Best Trolley Wire for Almost Any Service

The Northern Texas Traction Company does not confine its use of Phono-Electric trolley wire to busy streets and hard curves alone.

For example, the installation of No. 00 Phono-Electric shown (last track north bound) is for the medium travel on Houston Street—45 to 50 cars an hour.

When Phono-Electric is put up in service like this, the overhead doesn't appear prominently in breakdown and maintenance accounts for years and years.

The toughness, the homogeneity and the non-arcing qualities of Phono-Electric make it the nearest approach to a universal trolley wire.

Bridgeport Brass Company
Bridgeport Connecticut

2117

Segur Coil Winding Tools

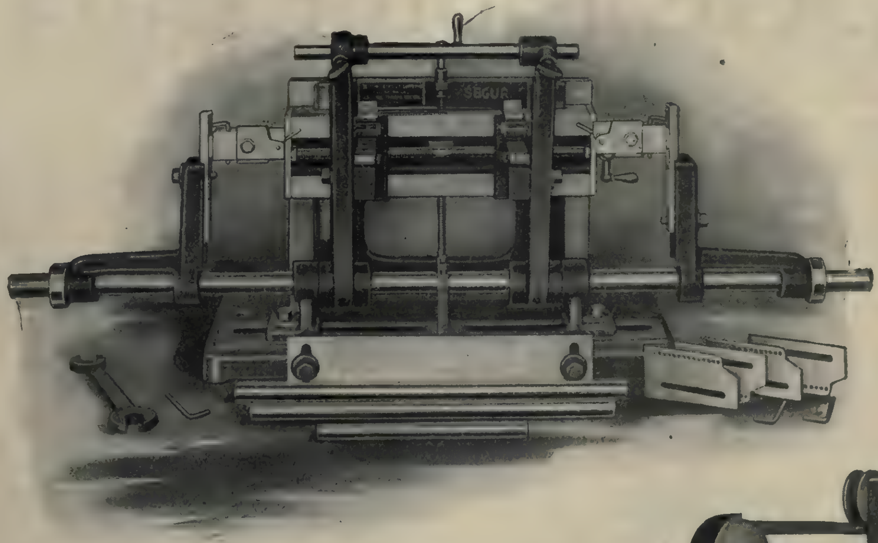
The line of Segur Coil Winding Machinery is complete and every machine is designed to produce work faster and better than past methods of coil winding.

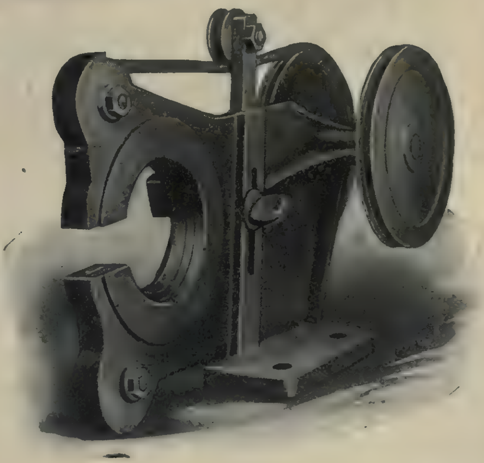
This broad line of practical labor-saving apparatus offers you timely assistance.

Write for data sheets.

Segur Hair-Pin Loop Winder

For winding loops from 3 to 36 inches in length. Note the adjustable jaws.





Segur Coil Spreader

After the coils are wound on the Segur Winder they are spread or pulled into proper shape by the use of this machine. This spreader is adjustable for coils of practically all sizes and shapes.

Segur Coil Taping Machine

After the coils are shaped they are ready for taping and dipping. This Segur Taping Machine with an experienced operator will tape them at the rate of 40 to 50 coils per hour.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

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Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

Make Every Day a 100% Work Day

These are days when every ounce of every workman's energy must be devoted to productive effort. Every man counts and every lick counts.

Street and Interurban Railways everywhere are patriotically glad to assume the problem of maintaining tracks and lines with fewer men.

And it can be done! Labor- and energy-saving equipment makes it possible. It's not a matter of getting more work out of each man, but of making the same amount of work more productive.

MUDGE Motor Cars

save an hour a day per man. They enable one crew to care for two sections. A Mudge car brings the crew to the work fresh, unfatigued and ready to put in a day of 100% productive effort. In this one respect alone a Mudge Motor Car will pay for itself in a surprisingly short time. Mudge cars are built in types and sizes for every crew or inspection purpose. Catalogue on request.

Mudge & Company
Railway Exchange, Chicago, Ill.

ARMCO IRON CULVERTS

bear the strain of traffic and the stress of elements

AMERICAN
ARMCO
INGOT IRON

RESISTS RUST

Years of service in all kinds of soils and under all climatic conditions have demonstrated their *lasting qualities.*

Used by leading steam railroads and electric lines in all parts of the country, and installed under countless miles of highways.

Only one quality—the best! The triangle trademark is your guarantee of genuine rust-resisting "ARMCO" Iron.

Insist Upon Rodded End Culverts

This reinforcement—an exclusive feature of "ARMCO" Iron Corrugated Metal Culverts—protects the protruding ends.

AMERICAN
ARMCO
INGOT IRON

RESISTS RUST

For full information on rust-resisting "ARMCO" Iron Culverts, Flumes, Tanks, Signs, Sheets, Roofing and Formed Products, address nearest manufacturer.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
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Indiana, Crawfordsville
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Iowa, Des Moines
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Iowa, Independence
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Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
New Hamphshire, Nashua
Northeast Metal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Works
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal & Boiler Wks.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
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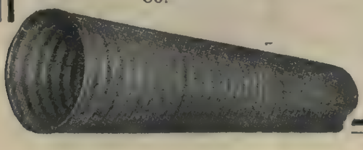
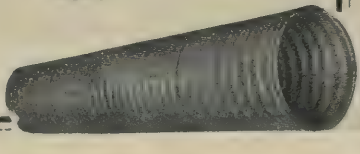




Abbott Rail-Joint Plates

make joints the strongest part of the track

AS an independent part, the Abbott Plate can be *and is* made harder, stronger and more elastic than the splice bars.

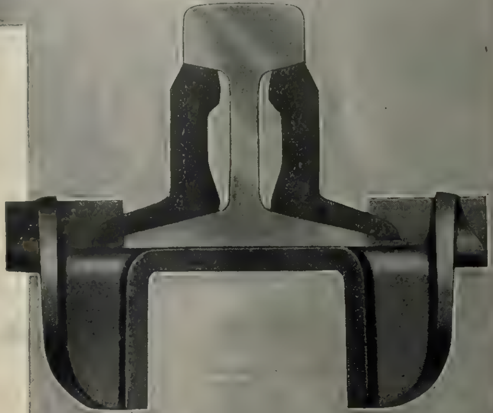
A slight camber, at its center, together with the high resilience of the axle steel we use, brings the rail ends to bear first, until as the wheel load approaches, the plate depresses into a full flat bearing with the rail bases and gives them the solid support of the two joint ties.

The strength and efficiency of this plate must be evident from the pictures. The combination of reversed flanging with 3-inch vertical depth of metal under the rail ends provides for internal stresses and brings the wheel load upon the joint ties in the same manner as the load on a short deck bridge is distributed upon its piers.

Service records demonstrate that Abbott Joint Plates will repay the cost of their installation during the first year by the saving in maintenance labor, at the same time make smooth running track surface, prevent the rail ends from battering, splice bars from bending or wearing, bolts from stretching; also will act as anti-creepers, and rail end guides, affording temporary protection where splice bars become loose.

Ask for our booklet
"Improved Track Appliances."

288



The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

Lackawanna Steel Company

LACKAWANNA, N. Y.

ATLANTA	CHICAGO	DETROIT	ST. LOUIS
BOSTON	CINCINNATI	NEW YORK	SAN FRANCISCO
BUFFALO	CLEVELAND	PHILADELPHIA	HAVANA

Transmission Line Calculations Simplified

$E_G =$ **Electromotive force at generator end of line, in volts**

$$E_G = \sqrt{(22{,}000 \times 0.90 + 101 \times 15.26)^2 + (22{,}000\sqrt{1 - 0.90^2} + 101 \times 15.86)^2}$$

$$= 24{,}098$$

Courtesy of Richey's "Electric Railway Handbook"

This Problem on the

MONROE

requires only 1 minute 4 seconds.

Complicated electric railway engineering computations are handled with top-notch speed and absolute accuracy on the Monroe. Many engineering offices are speeding up designs, estimates, pay-rolls, etc., by means of Monroe Calculating Machines.

The Monroe Visible Check enables the operator to check each figure as he proceeds, consequently there is no time wasted in running through the calculation a second or third time in order to prove the result. The simplicity and directness of the Monroe enable the inexperienced operator to obtain high efficiency after short practice.

Not only Adds but Subtracts, Divides and Multiplies as easily as other machines Add.

The greatest saver of time, money, mistakes and energy on all kinds of figure work in any office or factory.

Monroe Calculating Machine Company
Woolworth Bldg., New York City
Offices in Principal Cities

The coupon is attached for your convenience — mail it today and we'll arrange an interview or send complete details, just as you desire.

Monroe Calculating Machine Co.,
Woolworth Bldg.,
New York City.

☐Without obligation, send along a copy of "**Engineering Formulae**" and explanation of the simple method of Monroe operation.

☐Arrange for Demonstration........

Name ....

Address ....

E. R. J 10-26-18

Thermit at Los Angeles

Welds that Hold

This scene on South Main Street between Thirtieth Place and Slauson Avenue, (3 miles) Los Angeles, is one of several important Thermit Weld installations in that busy and beautiful city.

This particular installation was made in 116 lb. girder rail of 3 ft. 6 in. gage in 1913.

While not of the later Insert Weld type, the Thermit Welds in this work are giving excellent service as evident from the absence of trouble reports. No news in such cases is good news.

The Thermit Insert type of Weld we know will give you still better service in attaining

A Truly Continuous Rail.

METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco
7300 So. Chicago Ave., Chicago
15 Emily St., Toronto, Ont.
1427-1429 Western Ave., Pittsburgh, Pa.
Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

Use Trains Equipped with National Pneumatic Door and Step Control

For Relief from Congestion

The surface car train of today is found in various combinations such as end-entrance motor and near-entrance trailer; end-entrance for both motor and trailer; end-entrance motor and center-entrance trailer; center-entrance for both motor and trailer; motor car with motorless trailer; motor car with two-motor trailer; trains with or without multiple-unit connections.

But no matter what combination you select, you will find that its speed and safety in getting over the line will be greatly improved by installing

National Pneumatic Door and Step Control for quick, positive and laborless operation of doors and steps.

National Pneumatic Interlocking Safety Door Control for absolute safety to alighting and entering passengers.
National Pneumatic Motormen's Light Signals to eliminate waste of time with bell-cord signals.

Montreal, Philadelphia, Detroit, Cleveland are a few of the train operators using one or more of these National Pneumatic traffic accelerators. We shall be glad to meet your requirements, too.

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York

515 Laflin St. Chicago

The Inevitable Result

and

The Preventive

To neglect the grinding out of incipient corrugations and cupped spots in rails is just as certain to lead to bad track conditions and comparatively early replacement as the neglect of rust on an exposed steel structure is certain to lead to early destruction of the structure.

We all know that the periodic scraping and painting of the steel in bridges, viaducts and similar structures prolongs the life of the material and eventually saves a lot of money.

We know that wood or timber exposed to the weather requires regular painting to protect it from decay, and such painting is also an eventual saving.

It must be at least equally clear that neglected bad spots in rails will go from bad to worse under the impact of rolling stock and that the regular use of a

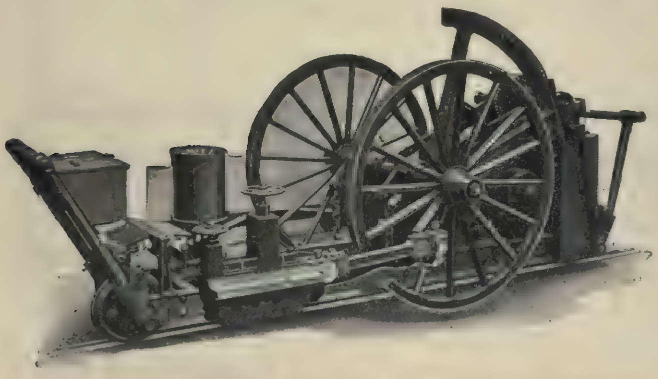
RECIPROCATING TRACK GRINDER

to remove such bad spots is an eventual saving.

The profits and economies in the painting of structural materials, however, important and valuable as they are, are achieved only after a period of time by reason of the lengthening of the useful life of the material.

The savings developed by the use of the Reciprocating Grinder also pay handsomely after a period of years by prolonging the useful life of track *and in addition* pay an excellent continuous return in the decreased cost of track and car maintenance by removing one of the most prolific *causes* of damage to track foundation, loosening of bolts and joints, and injury to car equipment, wheels and tracks.

The use of Reciprocating Grinders pays a *continuous* as well as an eventual profit.



Railway Track-work Company

30th and Walnut Streets, PHILADELPHIA

AGENTS:
Holden & White, Inc., 343 S. Dearborn St., Chicago

The First Elevated Road

Charles T. Harvey operating a car by cable power on the first elevated railroad, in Greenwich Street, in 1867.

In 1867—CHARLES T. HARVEY—by virtue of a bill passed by the Special Senate Committee of the Legislature was authorized to construct the first elevated railroad in the City of New York. The proposed line was to be 25 miles long—from the Battery to Yonkers with a fare of five cents for less than two miles and one cent for each additional mile or fraction thereof—with the option of changing to a straight ten cent fare for five years if desired. Yet in spite of the rate of fare and the approval of the commissioners the road was not a financial success—and Harvey and his associates never succeeded in getting the elevated further than the experimental stage! (Facts secured from Fifty Years of Rapid Transit by James Blaire Walker.)

Nothing daunted, however, other capitalists took the matter up—bonds were floated—the stock was "in demand—and at a premium" when the "Black Friday," Sept. 26, 1869, panic occurred—and the bankers promoting the bonds failed! In 1870, however, the line was completed to 30th Street and they attempted to operate it. Disaster after disaster followed, but finally in 1877 it was commented upon by the New York Herald in the following words: "Today the elevated railway is, as far as the track extends, one of the greatest conveniences the city has!" From then on its success was apparently assured.

Every innovation—every marked improvement—meets with a certain amount of opposition in its early stages—and with every form of imitation when its principle is finally proven a success.

Galena Oils

are no strangers to attempted imitation—the lead emulsifying process having been analyzed, tested, and imitated, but with so little success that Galena Oils and Galena Service still stand alone as the highest grade for electric railway service.

Galena-Signal Oil Co.

Franklin, Pa.

The future of the Electric Railway Industry

may depend on the result of the IMPORTANT MEETING of electric railway executives to be held in New York on

November 1st

This meeting takes the place of the annual convention of the American Electric Railway Association. Revolutionary changes may be crystallized by this meeting. Among the subjects which will be fully discussed and acted upon are such as government aid in assuring stability of electric railway investments, flat fare increases and the coming of zone fares, how auto competition is being met, etc.

Naturally, every executive in the electric railway field eagerly awaits the first complete news of the meeting.

Naturally, also, he will expect this report in his **Electric Railway Journal.**

To meet this need, the Journal will perform a journalistic feat and publish the news in a

Report Issue Dated November 2*nd*

Practically every road in the United States and Canada will be covered by the circulation of this issue. It provides, therefore, AN EXCELLENT OPPORTUNITY FOR ADVERTISERS to tell their story of helpfulness to a field eager to adopt any approved means for instituting more efficient and economical methods in the power plant or substations, in repair shops, on the line or on the cars.

Tell your story in a big way if your products can be used to advantage. **Printing begins October 28th.**

Write today saying how much space you want us to reserve for you.

Electric Railway Journal, 10th Ave. at 36th St., New York

The G-E 258

As to Uninterrupted Service

At Bellingham, Wash.
1,000,000 Miles or More Without a Defect

The wonderful reliability of the G-E 258 motor is demonstrated by its record on safety cars at Bellingham, Wash., where it has given more than 1,000,000 miles in 2 years of service with no other attention than the replacement of worn brushes!

On one line, North Street, these motors are on a schedule of 11.2 m.p.h. propelling the cars 197 miles a day or, allowing for idle time,

More Than 60,000 Miles per Car per Annum!

General Electric Company
General Office Schenectady, N.Y.

25-36

That's Logical Isn't It?

What would it mean to you in dollars saved in a year if you were using

G-E Renewable Pan Frogs

Just think what this means as a time saver in cases of emergency.

No tackle necessary—simply loosen two bolts—unclinch the ends—slap on a new pan—tighten the bolts—clinch the ends and the line is ready for service—all done in two minutes.

Better consider them.

40-7

GENERAL ELECTRIC COMPANY

General Office, Schenectady N.Y. Sales Offices in all large cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52 New York, Saturday, October 26, 1918 *Number 17*

Congratulations, War Board, On Universal Car!

YOU have made good the trust that Uncle Sam expressed in you when he asked on Aug. 19 through his Bureau of Industrial Housing and Transportation for a car that could be operated one-man, two-man, all-around-the-town, on 'most any city track. You wasted mighty little time in discussing the most esthetic location of rivets or the relative advantages of Prussian blue and Bulgarian yellow. You just tore off your coats, smashed through all the old-time barb wire of association procedure and came over the top with two complete cars in less time than it used to take to standardize a thumb tack! This at least is one benefit brought about by the war.

How Shall Our Engineers Be Trained?

SATISFACTORY construction and successful service of electric railways as well as other utilities depend to an increasing extent upon the engineer. He has to do primarily with the design, installation and maintenance of track and other structure, rolling stock, power generating and distributing system, signals, etc. But he also finds an opportunity, if he is a real, all-round engineer, to assist in solving operating and other administrative problems. The electric railway manager is therefore interested in anything that tends to improve the qualities of the engineers whom he employs; hence he will not want to overlook the report on engineering education which has just been completed for the Carnegie Institution on the Advancement of Teaching and is reviewed briefly elsewhere in this issue.

Every employer of young engineers has experienced some difficulty in fitting them into his organization. This he has blamed upon the technical schools, undoubtedly with some reason. At the same time he appreciates in part the handicaps under which the educators labor. He may not perhaps have realized the extent to which his dissatisfaction, or the reverse, is affected by those personal qualities with which technical education has not greatly concerned itself in the past, nor which in all cases it can greatly affect. The schools must admit, however, that in future more attention should be given to the training of faculties upon which depend success in the handling of men and materials. Possibly there will be less time for the academic variety of training.

The railway manager has little to do with the educational side of this subject, but he can hold a sympathetic attitude with respect to it. He may possibly have a son who wishes to become an engineer. He certainly must depend largely upon engineers for results.

Why Has the Administration Forsaken the Electric Railways?

WHY does the federal government persist in leaving electric railways to the far from tender mercies of local authorities? Mere querulousness does not prompt this inquiry. We sincerely desire to know, in the nation's interest, why electric carriers must suffer from the withholding of that direct relief which has been bounteously bestowed upon other industries little, if any, more essential to public welfare.

The details of government intervention in production and price-fixing in many lines are too well known to require enumeration here. Take simply one example—that of the steam railroads. Starved for years by one set of government agencies until, as Mr. McAdoo recently said, there existed "adverse conditions [which], coupled with the extreme difficulty of borrowing money, would probably have resulted in the failure of some of the most important railroads in the country to meet their obligations under private management," the steam railroads had to be placed under the control of a new government agency. Under the exigencies of war, the result has been an economic rather than a political treatment of such carriers. With almost startling rapidity the Federal Railroad Administration has adopted the common business practice of increasing rates to cover higher costs of operation.

Direct federal operation was necessary for the adoption of this economic principle in the case of the steam lines, in view of the co-existent object of securing unified operation with a minimum of competition. The electric railways, however, must simply be saved from destruction. Direct federal operation is not needed. The means for adequate public control already exist, although functioning too often along the wrong line. Hence to insure obedience to a sound economic principle the federal government needs only to exercise the same supervision over electric railway rates as it has been prompt to assert over electric railway wages. Why does not the administration recognize its responsibility in this regard?

It has been hinted that electric railway situations are political "hot potatoes," and that the federal government is reluctant to handle them in any way. Wherever such cases exist, they are almost invariably due to the fact that politicians refuse to let die campaign issues upon which they can appeal to the public on the basis of misrepresentation and passion instead of justice. Since the administration demands that politics be adjourned during these trying days, however, this ascribed reason cannot be the controlling one in government circles.

Rather does it seem that the federal government places implicit trust in state and local authorities to treat electric railways as the national interests demand. But regulation of the steam railroads had to be improved on its rate-making side; that of the electric lines needs similar treatment. The war has done much to broaden the American mind, but it has not removed the demagogue, or local prejudice, or the secret selfishness of the public in dealing with that inanimate object, the corporation. A situation that makes possible the Buffalo fiasco is hardly conducive to perfect confidence in a speedy and fair settlement of traction difficulties at the hands of the localities concerned.

Some publics, some cities, some commissions will perform their full duty to the nation; others will not. The probable percentage of delinquents nobody knows. But why should the government think it safe to gamble with the future on this point at the expense of part of a vitally essential industry?

Navy Publicity Tour Shows Practicability of Long-Haul Electric Freight

THIS journal has consistently advocated an intensive development of freight handling by interurban electric lines. The need for such development has been accentuated by war conditions. There are reasons why some lines have not found it possible or advisable to develop this class of business, but we feel sure that it will be of interest to all to note, from an article on the recent navy publicity trip through the Central West, with what facility through carload freight could be handled between Chicago and Detroit, Mich., Columbus and Dayton, Ohio, Louisville, Ky., and many other points, entirely by electric railway. In this case the freight was composed of replicas of a submarine, a destroyer and a submarine chaser, accompanied by a party of fifty sailors from the Great Lakes Naval Training Station. The trip was, of course, far from being intended to demonstrate the possibilities of interchange of through freight. Its purpose was the education of the public concerning the work of the various branches of Uncle Sam's fighting forces and a patriotic support of the government's request for money and of the various institutions working to make life more pleasant for our boys "over there." Nevertheless the success of the experiment goes to show on how extensive a scale freight could be handled on our interurban lines with a sufficient amount of equipment available.

The cars used on this trip were equipped with standard M.C.B. wheels, which have a deeper flange and wider tread than most interurban and city car wheels. For this reason a little trouble was experienced in paved streets, but the difficulties were readily overcome. It must be borne in mind also that in this case the cars were purposely hauled into the heart of the cities, while in handling freight such sections of road would be carefully avoided.

A point of further interest in connection with the navy publicity train is the patriotic service which was rendered by the electric railway of the Central States, which carried the train over their lines free of charge, interrupting traffic to permit its transport to the heart of the city, advertising the event in advance, etc. We believe that any other electric lines would feel honored in rendering similar service, although few have a chance to give such conspicuous assistance, or even to serve shipbuilding, munitions or other immediate war industries. If, however, each property renders the best service possible under existing conditions, with the smallest consistent consumption of energy, coal and man power, does all in its power to obtain a rate which will permit such a quality of service to be given and conscientiously backs the government in its demands and requests, it is doing much to help win the war, although it may not be decorated with the Cross of Honor.

Auto versus Car in Checking Devices

A HIGH-CLASS automobile costs say $5,000. Its annual run may average 15,000 miles. Frequently, the owner of the car is the operator. Naturally, he has a personal interest in operating his car as economically as possible. For all that he does not trust his own good intentions but instals the following checking instruments on his automobile:

A mileage register to give the number of miles operated; a speedometer to indicate the various speeds while operating; a gasoline gage to tell the amount of fuel in the tank; an oil gage to show if proper circulation of lubricant is being obtained; a volt-ammeter to measure the current and voltage of the batteries; a temperature indicator to indicate danger should the supply of cooling water fail, and a clock on the dasher so that the driver can learn the time without fumbling for his watch.

It is true that the automobile could be run without these devices, but they are used because the owner wants to know what service he can get from his tires and other vital parts, when fuel should be added and when more lubricant is required to avoid damage to the mechanism.

Now let us contrast this practice with that in vogue on more than 90 per cent of the electric railway cars of America!

An electric railway car costs from $4,500 to $30,000 or more, and prices are still soaring. It may average 45,000 miles per annum or three times that of the pleasure automobile. It is always run by an employee, who seldom has any definite incentive to run the car as economically as possible. If this car were to be provided with the corresponding checking instruments, the line-up would be as follows:

A watt-hour meter to show the energy consumed; a coasting recorder to check coasting time; a power-on recorder to check power-on time; a device to check the unnecessary use of the brake; a temperature indicator to warn the motorman when motors, bearings or other running parts are nearing a high temperature; gages to show brake cylinder as well as main reservoir pressures; a speedometer to enable him to know whether he is maintaining his schedule speeds; ammeters in the operating circuit to show the motorman what peaks he is obtaining so that he can operate to avoid them; a clock with the second hand interlocked with the operation of the car in order to record the duration of the stops, and a distance counter to integrate the mileage made by the car during its full moving time and also during the shorter power-on time. We do not say that all of the foregoing devices should or could be installed forthwith. Nevertheless, this parallel of checking devices on private automobile and electric railway car warrants the repetition of that fine old admonition: "Think it over."

Rate-Making Viewed in The Light of Common-Sense

A STINGING rebuke has been given by Justice Swayze of the New Jersey Supreme Court to the municipal advocates who during the last year have been fighting not with facts but with wind the plea of the Public Service Railway for financial relief. The case arose through the efforts of the League of Municipalities to prevent the recently approved 7-cent fare from being put into effect.

The chief point which city counsel tried to make, as noted elsewhere in this issue, was that the New Jersey Board of Public Utility Commissioners had no power to increase the fare because it was without evidence of the value of the property. Justice Swayze, however, shows little sympathy with this argument. As he tersely puts it, the determination of a just and reasonable rate is a business question, depending for its answer upon many factors besides physical property. With the old 5-cent rate long accepted as standard, and with no proof of its unreasonableness presented by the cities, the addition of an amount to cover the wage awards of the War Labor Board surely does not result in an unjust and unreasonable rate. Justice Swayze is repressive, but his inability to see how the New Jersey commission could have drawn any other conclusion renders further characterization of the cities' argument unnecessary.

As for the suggestions that the railway seek relief in curtailment of service or in receivership, the court seems reluctant to take the municipal counsel seriously. The plea, too, that franchise rates are immutable in New Jersey is met with the reminder that this court and the highest court of the State, the Court of Errors and Appeals, have in the Collingswood and Atlantic Coast Electric Railway cases ruled in favor of State paramountcy in rate-making.

Justice Swayze has done a thorough job in showing up the lightness of the arguments presented by the city counsel. They may learn; time will tell. Already they are talking of securing appeals *ad infinitum* and of revoking all franchises because the 5-cent fare clause has been disregarded by the State. On this latter point let us add a jolt. The theory of controlling decisions in this regard is that franchises are binding as between the contracting parties, the cities and the companies, but that such instruments cannot operate to prevent the State from exercising its sovereign rate-making power when it so wills. An intelligent man, therefore, should hardly expect the courts to permit the wholesale abrogation of franchises simply because the municipalities are not allowed to exercise a power which is not theirs.

The Proposed Chicago Franchise Possesses Many Signal Advantages

ASSAILANTS of the pending Chicago traction ordinance have been using two favorite arguments in their contention that it should not be approved at the coming referendum, They say that it will pave the way for increased fares and that it should not be submitted to a plebiscite while so many of the male voters of the city are fighting for their country in the lands across the sea.

It is true that the proposed franchise would give the trustees authority to change the basis of fare to meet costs of service whether the new fare be higher or lower than the existing rate. This provision, however, merely substitutes a local board (the trustees) for the State commission which already has such authority. The Chicago Elevated system has now been heard on an application for a 7-cent fare, and the Surface Lines management has announced its intention to seek more revenue through the Utilities Commission. The chances are that both systems will be able to satisfy the State authorities that a higher fare is necessary to meet increased costs of operation that are unavoidable in this present critical period.

If the new unification ordinance were now in effect, the combined system could undoubtedly furnish transportation at a lower cost than the competing companies can. Reduced overhead charges due to the combination of facilities and the less operating cost of carrying passengers on an enlarged elevated system will make this possible. It is, therefore, clear to any unprejudiced mind that the prospects of a high rate of fare would be less on the proposed unified system than under a continuation of present conditions.

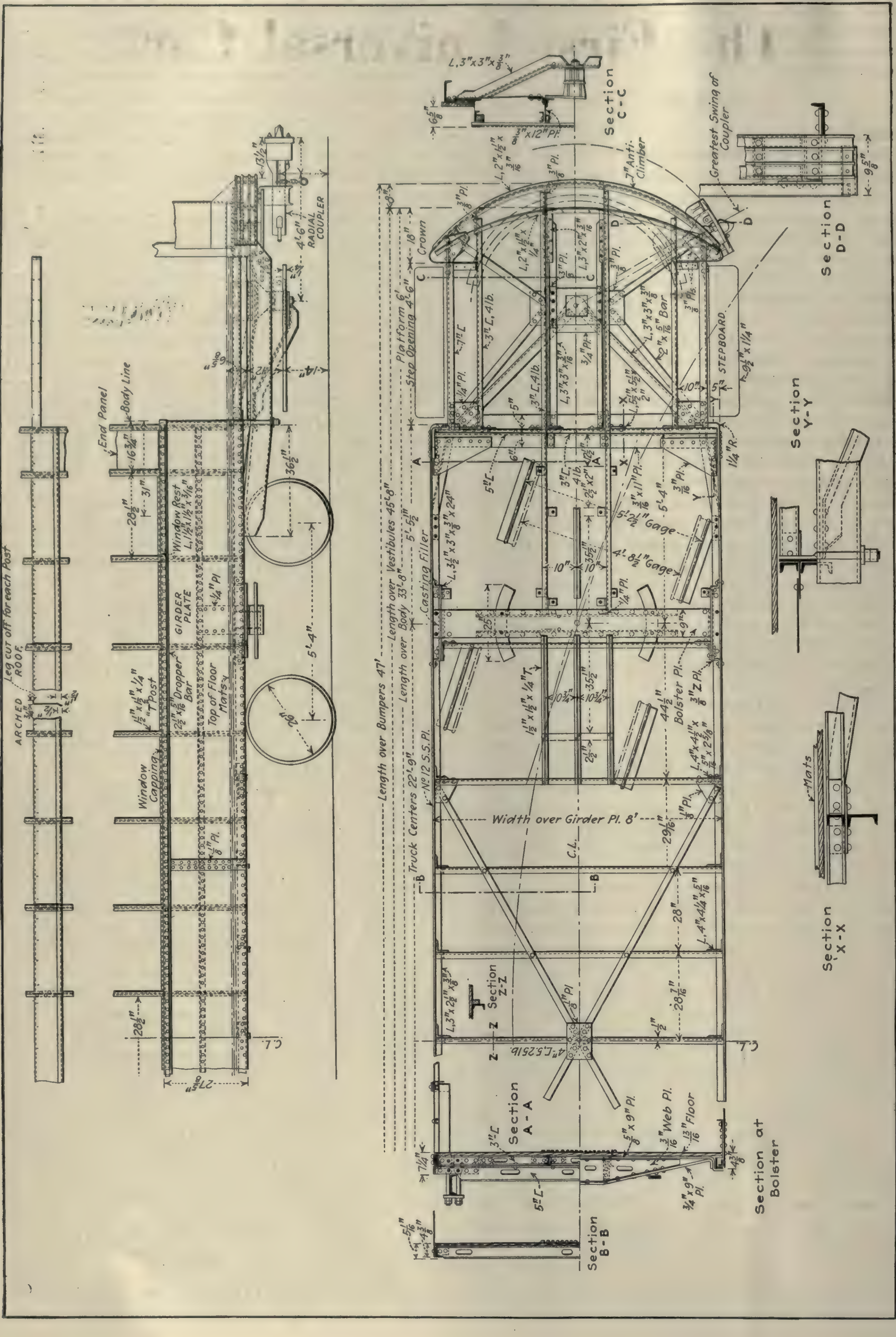
As to the other argument, the best answer is given by those who point to the fact that the ordinance if approved will call for the expenditure of $100,000,000 within six years and will give employment to thousands of men, including those who will be seeking work after their return from France. This will meet one of the most serious conditions that must be faced on the conclusion of the war—namely, the readjustment of the economic balance. War industries gradually must subside, and the men thus thrown out of work must look to other occupations for their subsistence. The public utilities, representing the industry of both war and peace, will be a considerable factor in helping to stabilize conditions.

If the men and women at home who have the chance of voting during war times overlook an opportunity like the Chicago situation to provide work for the returning soldiers and sailors, it would appear that they have not at heart the best interests of these absent men. The more opportunities of this kind that are offered, the quicker will the general economic readjustment take place and the less likelihood will there be of a serious financial disturbance to complicate the problems of reconstruction.

Don't Forget the Conference [*See Page 749 for Program*]

Place—29 WEST THIRTY-NINTH STREET, NEW YORK

Date—NOVEMBER 1, 1918 *Time*—ALL DAY, BEGINNING AT 9.30 A. M.



Underframe and Side Frame Details of Type A Car Submitted by A. E. R. A. War Board

The First Universal Car

Preliminary Details of the One-Man, Two-Man, Prepayment and Postpayment Car Submitted by War Board to Housing Bureau—Provides Latest Labor-Saving and Time-Saving Devices and Is Suitable for Either Single or Two-Car Operation under Great Variety of Conditions—Cars Have No Drop Platforms and Are Unusually Light

AS NOTED in the ELECTRIC RAILWAY JOURNAL for Oct. 19 the War Board of the American Electric Railway Association on Oct. 17 suggested two types of cars for use by the United States Bureau of Industrial Housing and Transportation, following a request for designs and specifications from Otto M. Eidlitz, director of the bureau.

Both designs, which are known respectively as designs A and B, were prepared by C. O. Birney in co-operation with several car builders and other manufacturers of electric railway equipment. Both cars are arranged for either single or train service, for operation by either one or two persons, and for either prepayment or pay-as-you-leave operation, single-end or double-end control. Type A is the one selected. With type B it is shown on the accompanying supplement.

DIMENSIONS, OPENINGS AND STEPS—NO DROP PLATFORMS OR RAMPS

Type A is 47 ft. 9 in. long over all and 8 ft. 2 in. wide overall. It is expected that these limiting dimensions will take care of any clearances in the cities where this car is likely to be used. The end platforms are 4 ft. 6 in. over the dashers with a clear entrance of 30 in. The side door has a clear opening of 48 in. The platform floors are on the same plane as the body floors, thus calling for three entrance steps as follows when a 26-in. wheel is used: From ground to first step, 14 in.; from first step to second step, 12 in., and from second step to floor, 6⅝ in.

The exit steps at the side are as follows: From the floor to first step, 8⅝ in.; from the first step to the second, 10 in., and from the second step to street, 14 in. These latter steps are fixed and within the car.

As it was the intent of the bureau to get a car for average rather than for exceptionally congested conditions, a comparatively short platform is used. From a constructional standpoint, this would mean a reduction in weight and maintenance; nor is the shorter length an operating disadvantage because, after all, the throat of the platform at the fare box and the seating arrangement are more important than the width of the steps. Weight and cost are also saved by the use of flush platform floors.

Further to save weight and reduce accidents, all ramps and wells have been avoided. The passenger who uses the side door steps directly from the car-floor level to the exit steps on the side of the car.

HIGH SEATING CAPACITY—PNEUMATIC DOOR AND STEP CONTROL

Since the car is arranged for double-end operation, the seating plan necessarily is symmetrical although the car may be used on both the pay-as-you-enter and pay-as-you-leave plans. The seats adjacent to the platforms, both end and side, are longitudinal while the rest are transverse. Folding seats are provided in staggered relation at the side doors, one for three passengers and one alongside for two. Other folding seats, including those of the motorman, are available according to the direction of running.

As a single-end, one-man car, the seating capacity would be sixty-one since three permanent seats could be added to the rear platform; as a double end, one-man car, the seating capacity is fifty-eight; as a single-end, two-person car, the seating capacity is fifty-six and as a double-end, two-person car, is fifty-three.

Because of the public's preference, transverse seats have been applied wherever they could be used without interfering with the flow of traffic. While the seats themselves are 32 in. over all, their actual seating space is 35 in. because the seats are set 3 in. from the wall of the car. Through special construction, comfortable knee-room is established with a centering of but 28½ in. Should the cars be used in a climate demanding no heat insulation, the aisle width between the cross-seats would be 26 in.; otherwise, 24½ in. The seats will be made of wood, steel and rattan.

All doors will be of the folding type, air operated, hung on ball-bearing type hinges. The end doors will be of the single folding type with two leaves and the center doors of the double folding type with four leaves. All doors will have rubber cushions and lower panels glazed in wireglass. As the cars are of the open-bulkhead type, no other doors are used. Among the reasons for operating the doors by air are the elimination of manual labor, the quicker action of the doors, the increased efficiency of fare collection and the decreased likelihood that cars will ignore would-be passengers

ANY CHARACTER OF FARE COLLECTION POSSIBLE

The foregoing arrangement of steps, doors and seats is adapted to any kind of fare collection desired. For example, if the car is used for heavy terminal loading at a prepayment area, passengers are at liberty to enter through one front and two center passageways, totaling 6 ft. 6 in. If used as a pay-as-you-leave car, passengers would enter via the front platform and pay as they passed the conductor stationed just forward of the center door. The arrangement differs from the usual pay-as-you-pass type only in permitting transverse seats in both sections because the car is double-ended. In this character of operation, the rear platform is locked. In emergencies, however, every door on the car or two-car train, could be unlocked. Inasmuch as these cars are likely to be distributed among different companies, no attempt has been made to specify the mechanical details of fare collection.

The total weight of Type A, completely equipped, is estimated at 34,700 lb. using four 40-hp. motors, multiple-unit control, couplers and other train-operating apparatus; or 30,700 lb. if equipped with four 25-hp. motors and arranged for single car operation only. In view of the decreased weight of these cars compared with preceding types of like capacity, their schedule speed with motors of the capacity mentioned will tend to run about 10 per cent higher. The air brakes will include safety control equipments whereby control, brakes, doors, steps and sanders will be interlocked as on the standard one-man safety car. Electric heating and thermostatic control are specified, the number of heaters to vary with climatic conditions, but usually ranging from eighteen to twenty-four. Ventilation will be provided through sixteen exhaust ventilators of approved type. The lighting circuit will comprise five circuits of 23-watt mazda lamps, with two circuits so ranged that either headlight can be turned on or off from either end of the car. Push-button buzzer signals will be available for the passengers.

Buttons will also be provided in all control stands for signaling between the motorman and the conductor or conductors. All wiring will be placed in a flexible, featherweight conduit.

CONSTRUCTIONAL FEATURES

The car will have straight sides, round vestibules, arch roof, all floors on one plane, folding doors and steps on right-hand side of each platform, folding doors and stationary steps on each side of center of car, open bulkheads and two sashes per window opening with top sash stationary and the lower sash arranged to raise. The general construction of the body is steel of commercial shapes with wood finish. Side posts and carlines will be formed as continuous pieces from sill to sill. The roof boards will serve as the ceiling.

The underframe will consist of standard commercial shapes. Two center sills will extend from the body bolster to the bumper. Because of this through construction, a sectional end sill reinforced underneath with a channel iron will be used, all being tied together with a gusset plate. Diagonal braces will extend from the gusset plates to the ends of the vestibule. Diagonal braces will also be used between the drawbar fulcrum and side sills of the car. If drop platforms were used, the center sills would have to be bent down under the end sills, entailing much additional weight. The ends of the car will be fitted with anti-climbers.

The reinforcement at the side openings consists of the usual cross-sill plus a channel iron which forms an arch from side sill to side sill. The pier panels at the side doors are reinforced inside with an extra plate. The letterboard is made of steel reinforced at the top with angle irons to give the necessary strength. The side girders are of No. 12 sheet steel, riveted to the side sills, seat rest and window rest angles and to the T-posts. At splices there is a plate on each side. The dropper bar is riveted through the window rest angles. The inside of the car will include a truss plank extending from the floor to the seat-rest angles, and a composition board will be placed between posts extending from the seat-rest angle to the window-rest angle. An air space is provided between the truss plank, the composition board lining and the outside steel girder. As the cars must be adapted to the greatest variety of overhead clearances, it was thought advisable to keep the roof low. Hence the proper height of trolley base, where necessary, is to be obtained by using the elevated stand of angle iron now so familiar through its common use on the safety car. The use of the stand also tends to reduce the noise of the trolley and saves the roof ventilators from being damaged by trolley poles.

Single-thickness car flooring of yellow pine will be used, with ⅝-in. maple floor strips on the platforms and in the aisles. Besides their use on all steps, safety treads will also be set in flush in the flooring at all door openings.

The trucks will be of the swing bolster type, having an interposed spiral spring above the plate spring and provided with a bolster guide. The wheelbase will be 5 ft. 4 in. and the wheels 26 in. Type A cars will have truck centers of 24 ft. 5 in. and type B, 22 ft. 9 in.

It may be interesting to note that practically all of the constructional features are based upon the experiences of Stone & Webster on a large number of properties in cities varying in population from 20,000 to 400,000. In fact, many cars built according to these principles have already been in use for nine years, which period has been ample to prove their merit from the standpoint of economical maintenance.

TYPE B, NON-SIDE-DOOR CAR

Type B, the alternate design submitted to the Bureau of Industrial Housing and Transportation, does not differ materially in construction and equipment from type A, but is intended for conditions where it might be more desirable to operate with doors on both sides of the platforms instead of using the end and side-door combination of type A. This car, as shown in the accompanying plans, is 47 ft. long, but has 6-ft. platforms with 4-ft. opening in the clear. This type is also intended for either one-man or two-man operation. The seating plan is a combination of longitudinal seats at the openings and cross-seats elsewhere. As a single-end, one-man car, it would seat fifty-nine; as a double-end, one-man car, fifty-two; as a single-end, two-man car operated near-side, fifty-seven; and as a double-end, two-man car, fifty-two, inasmuch as the conductor would be on the rear platform. The weight of this car completely equipped for train operation with 40-hp. motors would be 33,700 lb. and for single-car operation with 25-hp. motors and no drawbars, 29,700 lb.

Energy Consumption on British Tramways

At the recent annual conference of the Municipal Tramways Association of Great Britain J. M. McElroy, general manager Corporation Tramways, Manchester, said that the tramways of the United Kingdom use 620,000,000 kw.-hr. of energy annually, or about one-fourth of the total output of the country. Of this 79 per cent is used by municipal and 21 per cent by company undertakings. Of the total number of 176 British tramways thirty-eight have their own power stations and 138 purchase their energy. With regard to total consumption, however, 50 per cent of the electrical energy generated is used by tramways which produce their own power and 50 per cent is purchased from central stations.

Engineering Education Should Increase Production

MORE than three years ago the Carnegie Foundation for the Advancement of Teaching selected Prof. C. R. Mann, then connected with the University of Chicago, to make an exhaustive study of technical education in the United States. The results have now appeared in the form of a report which is being published.* In this work Dr. Mann has had the co-operation of the national engineering and other societies and of the technical schools generally. His purpose has been, first, to determine the present status of engineering education with respect to the needs of industry, and, second, to suggest principles and practices which would appear to be needed to improve this status. A very brief review of the report is presented here, not as a summary but rather to indicate its general plan and scope.

In collecting data for this report, among other plans used, circular letters were sent to engineers throughout the country, asking them what they considered the most important factors in determining probable success or failure in engineering. In the replies received personal qualities were mentioned seven times as frequently as knowledge of engineering science and the technique of practice. Of six groups of qualities headed respectively character, judgment, efficiency, understanding of men, knowledge and technique, the summarized votes of more than 7000 engineers placed character at the head of the list by 94.5 per cent and technique at the bottom by an equally decisive majority. This condition must, of course, be kept in mind by educators in planning their curricula and methods of conducting courses.

The plan of co-operative education, first introduced by the University of Cincinnati and later adapted elsewhere in principle if not in form, impressed Dr. Mann as containing the fundamentals of the ideal technical education. The plan was described in an original article in the issue of this paper for April 15, 1916, page 724, in its application to electric railway work, by a member of the faculty. About 100 of the industries of Cincinnati and vicinity are now co-operating with the university. The companies represent every important phase of engineering, so that the university is able to arrange the work schedules in such a way that each student progresses regularly through every phase of his specialty, from the crude and rough work to the more difficult and responsible positions.

Financially, this co-operative plan is very economical both for the university and for the students. The university has access without expense to shops and shop equipment that are worth millions of dollars and are never allowed to deteriorate or become antiquated. The total cost to the university per student per year is about $130, compared with $250 to $600 at schools of equal grade. The money earned during shop periods makes possible an engineering education to many a boy who could not otherwise afford it.

In addition to the financial advantage, however, Dr. Mann points out many educational advantages. The work, he says, has three marked points of superiority over that done in college shops: (1) It is real commercial production that must succeed or fail on its merits; (2) the variety is much greater than is possible in any college shop, and (3) the student is thrown in personal touch with workmen.

Of the ideas which Dr. Mann offers as necessary ingredients of a new method of training engineers, one of the most important is the adoption of testing and grading methods which will not only eliminate from admission to the schools those not qualified to pursue engineering studies, but will reveal throughout the course the progress of the student—progress not with reference to purely academic ideals, but to the equipment he will need in active professional life. Such objective testing and grading methods, he contends, will not only eliminate the unfit at the start, and insure progress having a relation to the needs of engineering practice but will furnish a sound test of abilities of teachers and spur them on to creative teaching work.

The method Dr. Mann proposes for the actual formulation of the courses is to have in each school a standing committee which shall decide what he calls the "common core" of all engineering education, no matter what the specialty. This "core" being defined with reference to the needs of the engineer, the committee would determine the time necessary to cover it adequately and would shape the courses accordingly, instead of arbitrarily parceling off to the different departments the time predetermined as available and letting each department crowd as much as possible into its allotted time. The common core would have studies under four main heads: (1) Participation in real industrial work; (2) engineering laboratory work, including drawing and descriptive geometry; (3) mathematics and science and (4) humanistic studies. Participation in industrial work would best be interwoven with the three classroom and laboratory divisions of the student's work. At the beginning of the course and while giving the common-core studies, the testing and grading methods already referred to would be applied.

In addition to the standing committee to take care of the "common core" studies, there should be additional committees, one for each of the semi-specialties offered at the school, such as civil, electrical and chemical engineering. Here the same method would apply: that is, the committee, having a clear-cut conception of the demands of present-day engineering, would determine first the equipment needed by young graduates and then the time required to obtain that equipment, and would develop the courses accordingly. This semi-specialized work would follow the "common core" studies, and again grading and testing methods would be used which would indicate the relationship between academic attainments and the qualities needed for success in engineering work.

As soon as it is possible, says Dr. Mann, to measure the results of teaching by impersonal means, successful teaching will be as easy to recognize as profitable research. Objective records of achievement have been found in industry to be one of the best incentives to creative work. Hence the line of progress in education does not lie in the direction of making arbitrary distinctions between research and teaching, but rather in the direction of removing the limitations placed upon the spirit of inquiry, so as to encourage its expansion to include education and human relations generally.

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*Carnegie Foundation for the Advancement of Teaching, 576 Fifth Avenue, New York City, "A Study of Engineering Education."

Peccavimus

[We have sinned]

Harsh days and Heavy have fallen upon us.

In our Careless Youth we covenanted with the Devil of Flat Fares to sell Our Soul forever and ever for Five Cents.

Then carefree we went our Heedless Way until Intake was met and overcome by Outgo.

Now like unto Hagar in the desert we wail aloud for Help.

And naught but the Mocking Echoes answer.

Many may Hear, but few Listen.

Even those who Listen dare not help because of the Swamp of Prejudice that lieth between.

Ah, had we but drained this Swamp in years agone with the dredges of Courtesy, Salesmanship, Frankness!

Yet, if there be solace in the thought, not we alone have committed Grievous Errors.

Yea, verily, every industry worth while hath Done the Same.

Before this Armageddon, what American banker believed that the People would buy Baby Bonds by Billions?

Who careth that we have sunk great sums in Unwise Policies or in Improvements long since Forgot?

Doth the Public plop Tears over the plight of the Hop-Grower, the Brewer and the Distiller?

If we be fit for this day and age, we must Prove it by Good Works: not by Cries for Succour.

Through our Own Neglect in days of Old to set aside enough from Earnings to replace track and plant as they Wore Out, and cars as they became Obsolete, we now lack the wherewithal to give good Service through the lean days of War.

So to the burden of higher wages, higher material cost and higher fuel cost, must be added the Loss of Travel from operating with Misfit Equipment.

The hat merchant and the 1898 head covering

Who would patronize a merchant whose latest Head Covering was of the vintage of eighteen ninety-eight?

Therefore, is it meet that we should expect the People to rush to the aid of the Electric Railway which operates dingy, unkempt chariots that are but a Laughing and a Scorn alongside the Jitney glorying in Sheen and Speed?

Honest, sincere publicity hath its Merits, but New Cars are of greater worth than a fulsome flock of Publicity Patterers with their camouflaging bunk, as it hath been rightly called.

But, brethren, even bright, quick-acting comfortable cars must not be expected to do all the Selling of Transportation. Though a Good Cigar may sell itself, yet doth the Cigar-Store Conductor rich in wisdom say "Thank You."

Ships are standardized, why not cars?

Never let us forget, and never must our Man-servants or Maid-servants forget, that the Electric Railway hath Competition both a-wheel and a-foot.

If the Electric Railway, perchance, is no more of these days than is the Camel, then is there no Law mighty enough to bring Salvation from the Jitney or the Bus.

Happily, it is not the Electric Railway but the Nineteenth Century point of view that is not of this Time.

Is it just that we ask the People to shoulder in the Future such burdens as these:

Prodigal prices for girder rails because nearly Every Company wanteth its own particular Section rolled to its Individual Specification?

Failure to drive forth fuel-wasting powerhouse equipment, duplicate pole lines and needless copper because we will not cooperate with our brother Central Station?

Deliver up a $10,000 car unto a Motorman who draweth without stint on a Million Dollar Power House because a power-saving device costeth a few Shekels and involveth the Care and Trouble of checking?

But, verily, that which is Worst of All, is never to adopt a car already used elsewhere; and seldom, if ever, to duplicate one's own car.

Who hath said that this is but as the Babble of Dreams?

So mocked the Old Shipbuilders at the thought of the Standardized Ship. Yet see what the Shipping Board hath made to come to pass with the Standardized Ship!

Whilst we keep on making electric cars Different with each order, we do but dissipate our Substance.

Yea, even the Safety Car is but the first step toward the Promised Land, for its cost per seat is twofold that of the Humble Ford that cluttereth the Highway.

Were we but as Wise as the Builders of the Automobile, the cost of our cars would not have risen One hundred to One Hundred and Fifty Per Cent compared with a Ten to Fifteen Per Cent in autos.

And yet it is Automobile steel, rubber and the like—not Cast Iron—for which our Government doth cry most loudly.

Brethren, blame not the Builder of Cars for this waste.

We, the customers, who always desired something somewhat different, are the Sinners.

Standardized street cars should be turned out ready to run at one-third their cost of To-day.

They who have so hardened their hearts as to keep to their own way in cars, in rails or other things should Pay the Price.

Let us judge a car as the Artificer judgeth a Machine Tool, namely, by its Work.

The Work of a car is to produce Revenue Miles. Let the standard car, then, have the Wherewithal to put forth such miles—be it air brakes, air doors, motor-driven fare boxes, recording fare registers or any other device that Saveth the Second.

If this new car be good for Five Hundred Thousand Miles, let us extract its Worth in Ten years or less instead of Twenty.

While running this car, let us Set Aside from its Earnings enough to buy a new car after it hath run its course.

Thus if a car cost Fifty-five Hundred Dollars new, putting by but one cent a mile and Five Hundred Dollars Salvage value of the first car will pay for it.

But in the meantime we will save far more than this in lower Operating Cost alone.

One car for all our Land?

Verily, no, but for at least Half the Mileage one car will do, and the other half can be provided for by two or three other standards.

The Confessions of an Electric Railway Operator

By JOHN A. BEELER

For the first half, the One-Man Safety Car equipped with all the latest Life, Labor and Time-saving Devices is the answer.

It saveth the Hire.

It saveth the Man.

It saveth the Accident.

It saveth Power which meaneth Coal.

It saveth the Maintenance of the Way.

Its speed and short headway overcome the Jitney, entice him who otherwise would walk to pay fare, and even cause the Rich to cease a large part of their riding in automobiles.

And, to-day, he who preferreth this car unto the auto showeth forth true love of country for he Conserveth Gas.

Who are they that object to a car that maketh the Lemon even as the Melon?

The Platform Men, the People?

“ 'Tis easier to lead a horse to water ——”

Not a Tithe as much as We with our prejudices and Groundless Fears!

Good money will not be thrown after bad by Bondholders and Stockholders, but there is always a way to get Money when we are going to Make Good.

Hearken not to the Tempter who saith it is easier to get a Five, a Six or a Seven-Cent Flat Fare.

Brethren, as it is easier to lead a Horse to Water than to make him Drink, so it is easier to Charge a higher fare than to make the public Pay the same.

Hundreds of railways have Obtained the higher flat fare.

How many are Satisfied with a plan that driveth off him who rideth but a Brief Span and retaineth him who exacteth the uttermost service?

For most cities, the increased flat fare with no improvement in service is but as membership in the Suicide Club.

The increased flat fare giveth away apace to thoughts of the Zone Fare.

Why should we not, like the Wise Merchant, sell according to Quantity and Quality?

Let us base our fares on distance, density, time of day and other matters that govern cost.

Let us not think in terms of High Fares for hauls of Great Length but let us think in terms of Low Fares and Short Hauls.

Then it will come to pass that we Attract customers; not Repel them.

When sales in the large package lag, the wide-awake merchant provideth a smaller one that turneth the trick.

Applied to our business the moral is that we need the Zone System, where everyone payeth for what he Getteth in the quantity that he desireth.

Let not the fear of fare collection complications stand in the way of Zone Fares. Hath the gathering of the flat six or seven-cent fare proven simple?

Cannot the Electric Railway afford to give up the Toe-hold of perpetual franchises if the Municipality will let go the Strangle-hold of the flat Five-cent fare, good to carry the passenger to the uttermost parts of Creation, reduce taxation, abolish unjust Paving Burdens and regulate the Impious Jitney?

When we commune with ourselves and ask whither the Electric Railway goeth, let us conceive how we would plan Transportation for any given city, regardless of Existing Conditions.

Would it be by autos, buses or cars?

Autos verily no, because of the high ratio of man power to passengers, of extravagant and dangerous use of streets and of inability to Serve Satisfactorily in every kind of weather.

Buses, perhaps, to a limited extent on broad, well-paved streets where the People are willing to pay the Higher Fares necessary.

Cars everywhere else, but frequently, with very Different Routing.

We would include new Traffic Rules to fit the change from the horse carriage and horse car to the automobile and electric car.

In all these matters let us work With our Public Service Commission instead of Against it.

Because it beareth most of the People most of the time, the street car deserveth Precedence and Preference.

Let us try likewise for the Staggered Hour plan for business. It will do Much for us as well as for the People. For us it meaneth two or three trips per car during the Rush Hour instead of one, fewer extras and lesser carrying charges on trippers. For the People it will go far toward the ideal of a seat for every passenger every time.

This car doth leave no room for the jitney

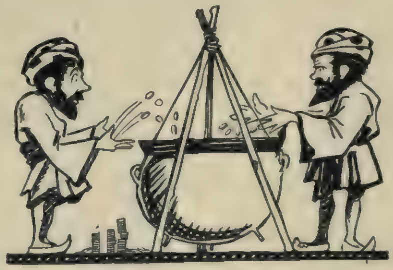
Where communities cannot or do not co-operate let us urge the justice of an Extra Rate of Fare during the rush hour to keep people on non-essential business away. Surely, in these days the Worker doth receive enough to pay any Just increase.

But these changes and readjustments can come Only when we are willing to throw into the Pot all that has gone before.

Make us to realize there is no fabulous Pot of Gold at the foot of the Traction Rainbow.

Let us then seek Forgiveness for coveting in olden days the flesh-pots of Egypt when we feasted on Short Hauls and Low Wages.

And covenanted in Perpetuity for the Five-cent fare, whereby the present shrunken and attenuated nickel must be Accepted for a ride from Dan to Beersheba.



Throw old ideas into the melting pot

Let us seek protection from the Pitfalls of Higher Flat Fares that sink us in Deeper Misery than before.

Help us to help ourselves and enable us in a spirit of due Humility to become satisfactory Public Servants.

Let each of us become an Efficient Laborer that is worthy of his Hire.

Yea, though we have Sinned, good works will open the Gates of Salvation.

How Public Service Railway Is Helping Build Ships in Newark Vicinity

A Two-Mile Extension, Connecting Track, Prepayment Terminals, Carhouse and New Cars Help Haul the War Workers — The New Facilities Cost More Than $800,000

THE marshy meadowlands bordering on Newark Bay, east of Newark, N. J., and included in the tongue of land between the Passaic and Hackensack Rivers, have changed almost overnight from the breeding place of the famous Jersey mosquitoes to shipyards, army quartermasters' and engineers' depots and other works devoted wholly to war-time activities. This change has thrown a considerable burden upon the local electric railway system, the Public Service Railway. In some instances the problem of providing local transportation was particularly difficult because of the distance of the new and rapidly-growing industries from the old railway lines. The railway company has been further handicapped by the difficulty of securing operating crews because of the high wage rates prevailing in the war-industry plants. Of the shipbuilding plants the largest is that of the Submarine Boat Corporation. This plant, which is controlled by the Emergency Fleet Corporation, is next in size to the great Hog Island shipyard. It has ways for twenty-eight ships and employs about 12,000 men. Its location is indicated in the lower right-hand corner of the accompanying map as the terminus of a new extension to the existing lines of the Public Service Railway. Two other important shipyards are those of the Foundation Company and the Federal Shipbuilding Corporation, both located on the narrow tongue of land between the Passaic and Hackensack Rivers at the head of Newark Bay. These plants are near the Lincoln Highway over which the railway company's double-track line to Jersey City passes. More than two-thirds of the employees of the Submarine Boat Corporation live either in New York or at some other place east of the Hudson River. The same is true of about 85 per cent of the employees of the other two shipbuilding companies. The employees of these companies are carried eastward over the Lincoln Highway and are delivered either to the nearest terminals of the Hudson & Manhattan Railroad or to the ferries from which they are distributed to various points in Manhattan and the other boroughs of the City of New York. As was noted before, no direct means of local transportation was at first available to the employees of the Submarine Boat Corporation, and until recently their transportation either directly to their homes or to the Newark terminal of the Hudson & Manhattan Railroad, has been dependent upon workmen's trains operated over an extension of the Central Railroad of New Jersey, buses operated by the Public Service Railway, private jitneys and a ferry operated in the morning and evening between the shipyard docks and New York. While the other two shipyards are located near an existing street railway line, the loading of the 4500 employees of the Foundation Company and the 7500 employees of the Federal Shipbuilding Corporation in the open street was, as might be expected, a difficult problem involving much confusion and delay to the regular traffic. The problem of furnishing transportation to these shipyards has been further complicated by the large number of other manufacturing plants engaged in war industries, whose peak loads have to be handled simultaneously with those due to the shipyards. Among these plants may be mentioned the International Arms & Fuse Company employing 9020 workers and located in northern Newark, the Singer Sewing Machine Company, employing 6500 workers, and the twenty-two companies of the Waverly Manufacturing Association, an association of manufacturers including such widely diversified interests as the Weston Electrical Instrument Company and companies engaged in the manufacture of leather goods.

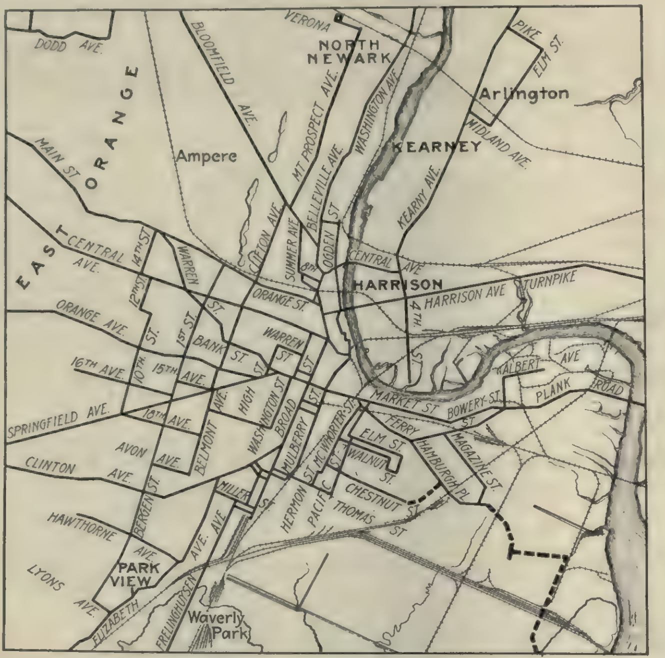


FIG. 1—MAP OF NEWARK AND VICINITY

The problem of providing sufficient crews for operating the extra cars required at the shipyards during the rush hours was solved, as in a number of other instances noted in recent issues of the ELECTRIC RAILWAY JOURNAL, by the shipyards furnishing men who had had previous railway training. At present the Foundation Company is furnishing five crews and the Federal Shipbuilding Corporation sixteen crews. As at other shipyards furnishing similar service, the railway pays for the platform time of these men at the

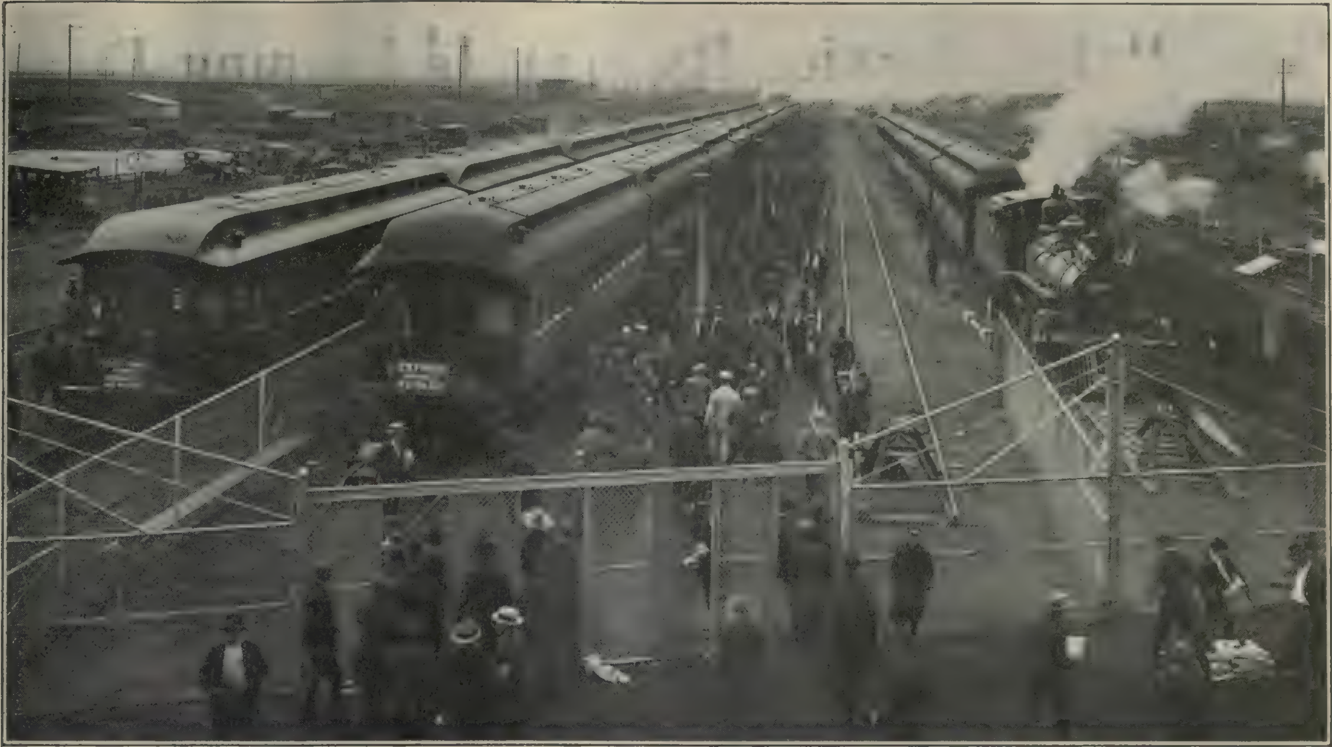


FIG. 2—CONDITIONS WHICH MADE THE NEW LINE NECESSARY

minimum rate paid platform men, the difference between this rate and that prevailing at the shipyards being paid by the Emergency Fleet Corporation.

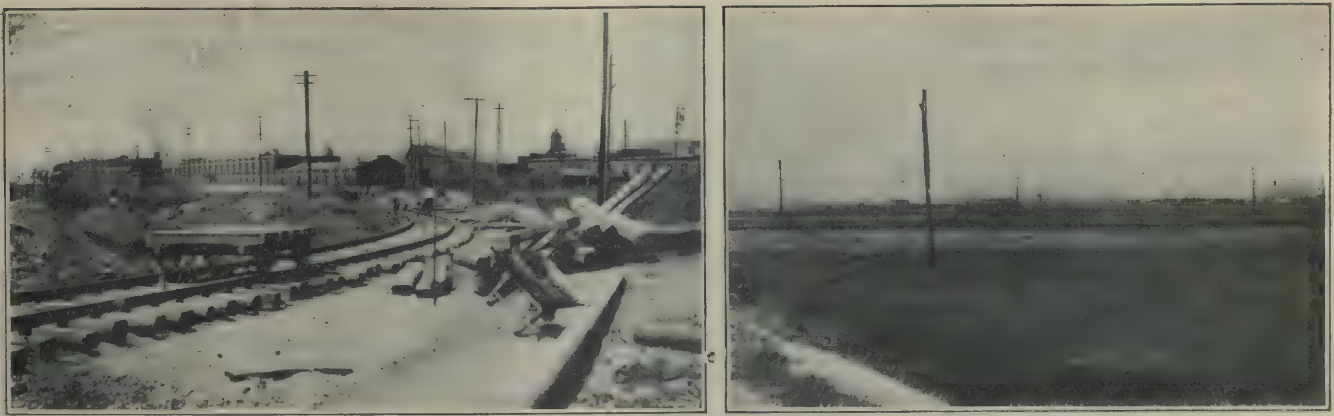
NEW FACILITIES WILL COST NEARLY $1,000,000

To insure adequate transportation for the shipyard workers, the Public Service Railway Company, in cooperation with the Emergency Fleet Corporation which is financing the new work, has either completed, or has in process of construction the following: An extension from its present line at Wilson Avenue (until recently Hamburgh Place) and Avenue L to the Submarine Boat Corporation shipyard at Avenue R and Port Street on Newark Bay; a connecting line on Gotthardt Street connecting the existing tracks on Chestnut Street with those on Wilson Avenue; a prepayment loading terminal at the plant of the Federal Shipbuilding Corporation, and a new car shop. The available rolling stock is also being increased by the purchase of eighteen new cars. As was noted in the ELECTRIC RAILWAY JOURNAL for Aug. 3, 1918, page 188, these additions to the physical equipment of the railway will cost in excess of $800,000.

With these added facilities in full operation the workers at the shipyard of the Submarine Boat Corporation will have direct and convenient trolley transportation to the Newark terminal of the Hudson & Manhattan Railroad as well as to all parts of Newark vicinity. The present difficulties in fare collection and traffic congestion at the plant of the Federal Shipbuilding Corporation will also be eliminated.

HEAVY CONSTRUCTION IS A FEATURE OF THE NEW EXTENSION

Of the new additions, by far the most important is the double-track extension to the Submarine Boat Corporation's shipyard. This extension is being built over land which, while within the corporate limits of Newark, is part farm land and part marsh. The illustrations in Figs. 3 and 4, taken while the construction work was in process, give some idea as to the nature of the terrain. While the extension is only about 2



FIGS. 3 AND 4—TERRAIN OVER WHICH NEW LINE WAS BUILT

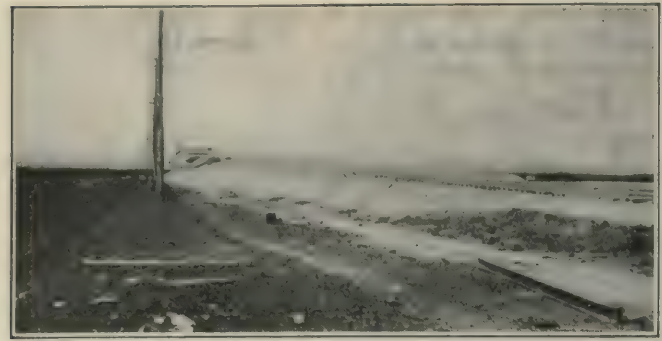


FIG. 5—THE FILL AT THE SOUTH APPROACH OF THE OAK ISLAND VIADUCT

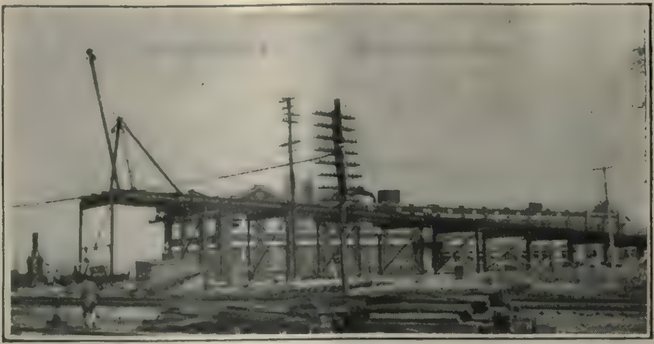


FIG. 6—ERECTING THE STEEL ON ONE OF THE VIADUCTS

miles long, it is of interest from an engineering standpoint because of the amount of heavy construction work necessary and the uses made of available material, new material being difficult to obtain notwithstanding the necessary character of the work.

The route of this extension is indicated by dash lines on the map in Fig. 1. Starting from the intersection of Wilson Avenue and Avenue L, where the company already had in place a two-track stub, the extension runs along Wilson Avenue to a point a few hundred feet beyond Doremus Avenue, and thence on private right-of-way to the intersection of Doremus Avenue and Avenue R. From this point it follows Avenue R to the shipyard. As beyond Doremus Avenue, Wilson Avenue was only a country lane, the city authorities had to condemn land to make the street wide enough for the car tracks and driveway. For about two-thirds of the distance the private right-of-way runs over a salt marsh, and to bring this to grade necessitated a fill of about 25,000 cu.yd. This fill was made of cinders, the grade being such that at high tide the tracks are about 1 ft. above the water level.

Another construction difficulty was encountered due to the fact that the great Passaic Valley sewer with a bore of 12 ft. 6 in., runs down the center of Wilson Avenue. When the back fill was placed over this sewer, a corduroy of planks and scrap timber was placed over the top to afford a foundation for the roadway. As will be noted in Fig. 3, some excavation was necessary to the preparation of the subgrade on this avenue. The corduroy greatly increased the difficulty of making this excavation, although it was made with a steam excavator. The material removed was used to fill the lower part of the approaches to the viaduct over the Central Railroad of New Jersey.

Three steam railway crossings are encountered on the route of the extension; the Central Railroad of New Jersey, the Oak Island yard of the Pennsylvania Railroad and the Lehigh Valley Railroad, and the shipyard tracks of the Pennsylvania Railroad. As none of these is a grade crossing, an exceptional amount of heavy viaduct construction has been necessary.

ONE VIADUCT REQUIRED 140 TONS OF STEEL

The viaduct crossing the eight tracks of the Central Railroad of New Jersey is of steel. The clearance over the steam road tracks is 22 ft. 6 in. and the approaches are each about 600 ft. long and are on a 5 per cent grade. The beginning of each approach consists of an earth fill held in place by a monolithic concrete retaining wall. The steel work included in the viaduct and in approaches is 1000 ft. long and includes one 110-ft. through truss span and one 50-ft. through girder span. In all 140 tons of steel was required for this structure. A view of the last approach in process of erection is shown in Fig. 6.

One of the interesting features in connection with this construction was the fact that the eighty-wire line of the Western Union Telegraph Company had to be cabled to clear the steel work. One of the Telegraph

FIGS. 7 AND 8—CONSTRUCTION VIEWS OF THE OAK ISLAND VIADUCT

company's terminal poles, together with the cable, are shown in the foreground. The columns of the viaduct approaches are of 8-in. H-sections. Built-up columns support the trusses and girders. The floor beams are of 24-in. Bethlehem I-sections, while the track stringers are of similar cross-section but 20 in. in height. The bents on the approaches are spaced 25 ft. apart. As part of the footings for the columns came over the sewer mentioned above, special care had to be taken in their design so as not to exceed the safe load which could be imposed upon the sewer. For these footings the loading is 1000 lb. per square foot. The approach retaining walls required 300 cu.yd. of concrete and 600 cu.yd. was used in the footings for the viaduct columns. This viaduct carries only the electric railway tracks and was built by the Public Service Railway.

THE AVENUE R VIADUCT CROSSES A RAILROAD YARD

Avenue R is a new street being opened along Newark Bay by the City of Newark. As this avenue crosses the large Oak Island classification yard belonging to the Pennsylvania and Lehigh Valley Railroads, a long viaduct involving some heavy construction work has been necessary. The avenue is designed for vehicle as well as street railway traffic, and the subgrade work has been done by the municipal authorities. The viaduct construction has been done jointly by the two railroads, the Lehigh Valley being responsible for two-thirds of the construction and the Pennsylvania for the remainder. The material for the fill at the north end of the viaduct was secured from the great heaps of rubbish dumped on the meadows years ago by the City of New York. This material was loaded into wagons by means of steam shovels and hauled to the site of the dump. The south approach, a view of which is given in Fig. 5, was built for the city by the Pennsylvania Railroad. The sand used for this approach was brought from Perth Amboy in scows to the shipyard docks, where it was loaded into dump cars which were then hauled to the site of the fill. Owing to the marshy nature of the subsoil, considerable difficulty has been experienced because of the subsoil flowing out from under the fill. About 500,000 cu.yd. of material was required for the two approaches.

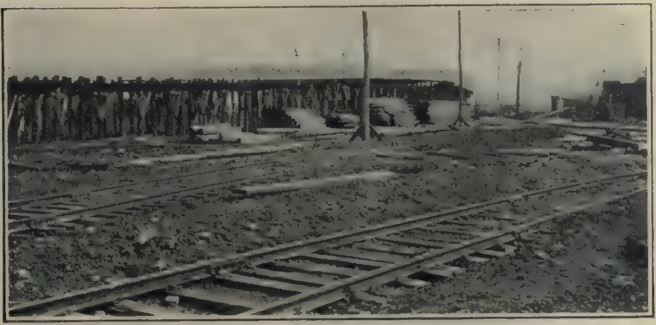


FIG. 9—PILE TRESTLE AT THE SHIPYARD

Views of this viaduct taken while it was under construction are shown in Figs. 7 and 8. As will be seen from these illustrations, the steel work, which consists of through girders, rests on concrete piers. Owing to the difficulty of getting steel work delivered in time for the purpose, the girders used are of a miscellaneous lot gathered up by the railroads from elsewhere on their lines. The source of supply accounts for the variety in girder designs. The piers themselves are supported on concrete-capped pile foundations. They are spaced, depending on the arrangement of the yard tracks, from 40 to 90 ft. The viaduct carries both the double-track way of the electric railway and the highway. The tracks are placed on one side of the viaduct floor. The floor itself is of plank spiked to wooden stringers which in turn are supported by the steel floor system.

Both the railway tracks and the highway are carried into the terminal of the Submarine Boat Corporation over a wooden-pile trestle. This trestle also affords a crossing over the shipyard tracks of the Pennsylvania Railroad. The trestle approach starts part way up on the fill made to the Oak Island viaduct. Some idea of the magnitude of the trestle work can be gained from the statement that it consists of seventy-nine bents, in the construction of which about 1000 piles were used. The trestle approaches are on a 3½ per cent grade.

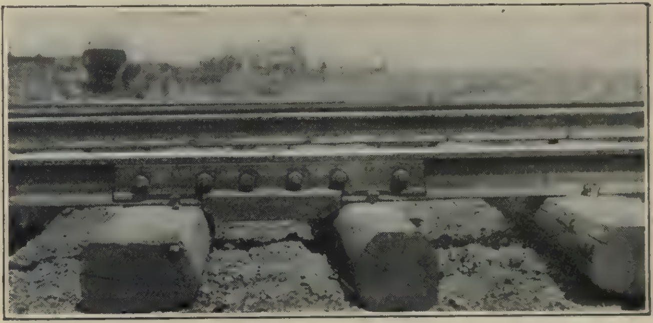


FIG. 10—DETAILS OF THE RUSSIAN RAIL JOINT

The tracks are laid with so-called Russian rail. This rail derives its name from the fact that it is a part of the large order which was rolled for the now defunct imperial government of Russia and as it could not be delivered it was taken over by our government. It weighs 67½ lb. per yard, is T-section, but has a lighter head than our standard T-rails of approximately the same height. The angle bars which were manufactured to go along with this rail are of peculiar construction. A view of one of the joints is illustrated in Fig. 10. It will be noted that the bar has a projection downward over the foot of the rail. Two similar shorter projections located on the ends of the angle bar, as shown in the view, have been burned off with an oxy-acetylene cutting tool so as to permit the placing of the ties. The rails are laid to the standard gage, 4 ft. 8½ in., with a devil strip 5 ft. in width. The ties are of chestnut, 6 in. x 8 in. x 8 ft., and are spaced 18 in. apart on cinder ballast.

The connecting link on Gotthardt Street is 2000 ft. in length and is also double-track line. It is laid with 116-lb. Public Service standard grooved rails on chestnut ties, which in turn are carried on rock from the company's own quarries at Fairview, N. J. The paving is of stone block with the voids filled with grout. The street was already paved and the new construction involved the removal of practically all of the old paving. The concrete foundation of the old paving was unusually thick and strong and could not be broken up with a steam shovel. It was broken into pieces small enough to handle by the use of drills, sledges and levers.

To facilitate the loading of the passengers and to insure fare collection, a prepayment loading terminal has been constructed on the premises of the Submarine Boat Corporation. This, as is shown in Fig. 11, is a stub-end terminal projecting well back into the shipyard. The platforms are long enough to provide ample storage space for the cars while they are loading, and crossovers permit the transfer of cars from the incoming track to the outgoing track. The arrangement of the turnstiles is shown in greater detail in Fig. 12.

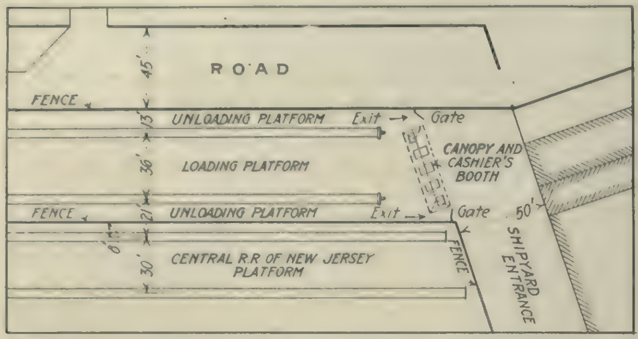


FIG. 11—PLAN OF THE PREPAYMENT TERMINAL AT THE SHIPYARD

Overhead Line Construction

With the exception of that on the steel viaduct over the Central Railroad of New Jersey, all of the overhead work, including that on Gotthardt Street, is of the usual span-wire construction. Most of the overhead line hardware and fixtures, such as trolley frogs, pull-offs, cross-arm chairs, etc., were either made in the company's own shops or after designs furnished by the company. On the major part of the private right-of-way, the poles had to be set in the marsh, where the ground, while firm enough to permit digging, was so low that the holes filled with water as soon as they were dug. To keep the poles in position they were concreted in at the top and bottom of the holes and set with a rake of 18 in. All of the iron poles were set in concrete.

The method used for supporting the poles on the steel viaduct is illustrated in Fig. 13. A stirrup made of steel plate is riveted to the floor beam and braced to the upper chord of the viaduct with an angle iron. A circular casting over which the bottom of pole fits is bolted to the bottom of the stirrup, and at the top of the floor beam the pole is held in place by a band which in turn is fastened to the double angle-iron bracket shown in the illustration. Figs. 14 and 15 illustrate the pole fastening employed on the Oak Island viaduct, the circular castings there being anchored to the concrete piers.

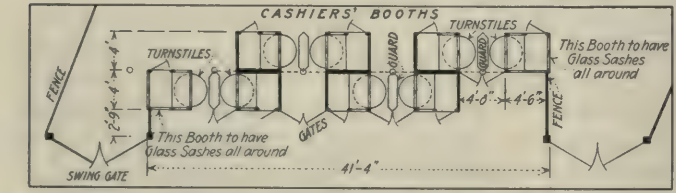


FIG. 12—ARRANGEMENT OF THE TURNSTILES AT THE SHIPYARD TERMINAL

The power supply comes from Newark substation which is located near the Passaic River well up in Newark and nearly 2 miles from the nearest end of the extension. From the substation, two 1,000,000-circ.mil paper-insulated, lead-covered cables are carried underground to McWhorter Street. Here they are connected through 1200-amp. switches inclosed in wooden switch boxes to two 1,000,000-circ.mil triple-braid weatherproof aërial cables, which are carried to the new extension. Some details of the use of aërial cables by Public Service were given in the issues of this paper for June 22, 1918, page 1182, and June 29, 1918, page 1229.

One of these feeders stops at the beginning of the extension, while the other is carried to the Newark end of the Oak Island viaduct. From this point a 500,000-circ.mil cable is carried to the shipyard terminal.

The feeders are tapped into the trolley wire every 500 ft., and at each second tap a Westinghouse MP lightning arrester is located. There is a similar arrester at the point where the cables change from underground to overhead construction. The taps to the trolley are made by using a copper span wire insulated from the poles by strain insulators and connected at one end to the feeder and along the span to the trolley wires by means of feed yokes.

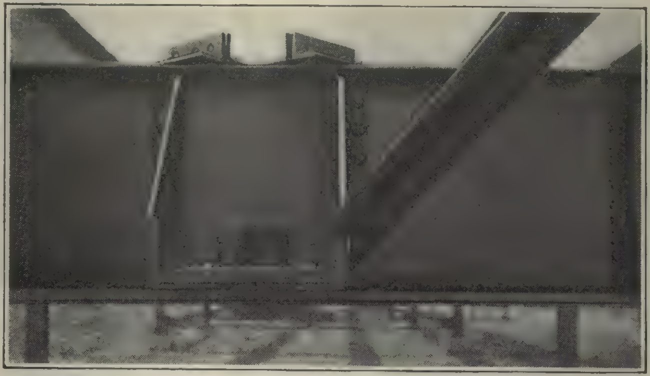


FIG. 13—SUPPORTING THE POLES ON THE STEEL VIADUCT

A better idea of the amount of copper required can be gained from the statement that for the extension alone 3200 ft. of 1,000,000-circ.mil paper-insulated, lead-covered cable, 24,000 ft. of 1,000,000-circ.mil triple-braid weatherproof cable and 4000 ft. of 500,000-circ.mil triple-braid weatherproof cable was required. To supply the Gotthardt Street connecting link, a 300,000-circ.mil aërial cable is carried along the track. This is connected into the existing feeder system, which has been reinforced by a 500,000-circ.mil cable running back to Newark substation. The feeders are supported on glass cable insulators mounted on locust N.E.L.A. standard pins, except at the curves where composition insulators and iron pins are used.

The rails are depended upon for the return circuit and are bonded with 8-in. No. 0000 gas weld bonds. Cross bonds are placed every 1000 ft. To render the bonds less conspicuous they were given a coat of dark paint.

The eighteen new cars purchased to augment the rolling stock of the company are similar to those described in the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1916, page 115. They are 50 ft. 2 in. over vestibules and are equipped with longitudinal seats with a seating capacity of fifty persons. They are of the prepayment type, with rear-end loading and rear and front-end unloading. The folding doors and steps are operated manually by a mechanical device, developed on the Public Service Railway, which is so designed as to insure the steps being in the lowest possible position before the doors are opened wide enough to permit a passenger to pass. The electrical equipment of the cars consists of H-L-D control and four Westinghouse 514 motors mounted on the Standard Motor Truck Company's 0-50 trucks.

Supplying Additional Shop Facilities

The greatly increased traffic and the additions to the rolling stock have necessitated an increase in the shopping facilities. This is being secured by constructing a new maintenance shop along the Lake Street side of the Bloomfield Avenue and Lake Street car storage yard. The new building is of brick, and is one story in height and 50 ft. wide by 162 ft. long. The shed roof is supported by steel roof trusses. The roof itself consists of wooden sheathing which supports a Barrett specification, five-ply paper-and-slag roof covering.

As will be seen from the general floor layout indicated in Fig. 16, provisions are made for three tracks, the center one being equipped with a wheel-changing jack and the other two with car hoists. Except for a short distance from the front along the walls the main floor consists of a 6-in. reinforced-concrete slab supported above the pit floor on concrete pillars. The front door openings are 16 ft. in height and are provided with double, hinged doors. At the back end of the shop a range of small rooms are taken up by the heating plant boiler, the oil storage, the storeroom and washroom. The machine shop is conveniently located in the space between the ends of the pit tracks and this range of smaller rooms.

In addition to the large windows in the side walls six skylights, arranged in two symmetrical rows, provide daylight illumination. The shop is heated by an indirect steam system, air being drawn by a blower through the heating coils over the boiler and forced through for main distributing duct. Two of these are under the floor platform between the tracks and the other two are carried along near the side of the building on the lower chords of the roof trusses.

The new construction at the plant of the Federal Shipbuilding Corporation consists of a two-way connection to the existing tracks of the Public Service Railway on the Lincoln Highway and a prepayment terminal loop on the shipyard property. As the shipyard abuts on the highway, the connecting tracks are short. However, to reach the highway they must cross Morris Canal. As this canal is still in use, a hydraulic lift bridge will be constructed over it. The terminal is so arranged that the unloading platform is directly in front of the entrances to the shipyard, while the loading platforms are located on the other side of the loop. Access to the latter platforms can be gained only by passing through the prepayment turnstile-equipped gates. Of this new work, that in the highway is being done by the Public Service Railway, and that in the bridge and the work within the yard by the shipbuilding company, after plans which were furnished by the railway company.

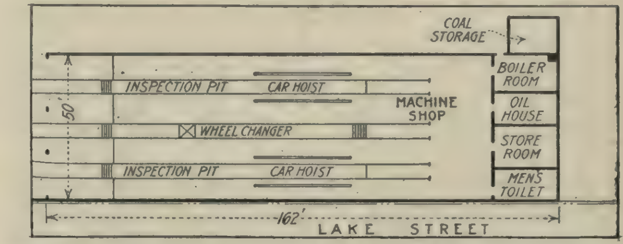
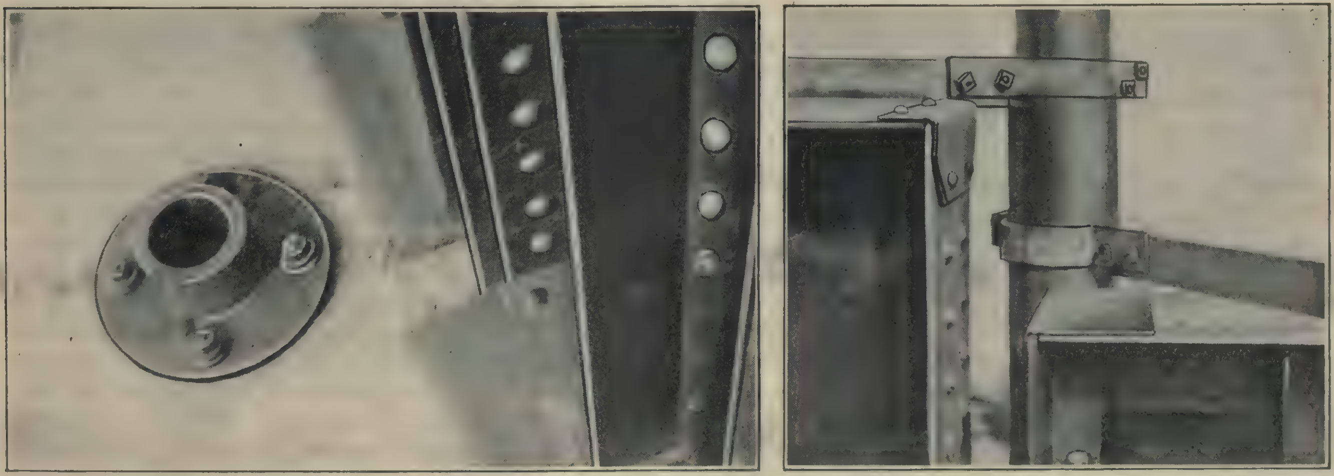


FIG. 16—GENERAL LAYOUT OF THE NEW CAR SHOP

This terminal was requested by the Emergency Fleet Corporation and is being installed under the inspection of the transportation division of that corporation, of which A. Merritt Taylor is director. The work on the Port Newark extension had been started before the organization of the transportation division of the Emergency Fleet Corporation and the federal supervision is in the hands of Admiral Francis T. Bowles of the United States Shipping Board.

The overhead work in all of the new additions has been done by the regular line gangs of the railway company's distribution department. The railway has been responsible for the construction of all of the track work on Gotthardt Street and the new extension to Port Newark, with the exception of that within the shipyards.



FIGS. 14 AND 15—HOLDING POLES ON A VIADUCT WHEN THE GIRDERS ARE UNEQUAL IN HEIGHT

Wages Up Faster Than Living Costs

Data Presented by the Kansas City Railways to the War Labor Board Show 81 Per Cent Rise in the Cost of Living Since 1900 but 146 Per Cent Advance in Wages

EVIDENCE presented to the National War Labor Board by the Kansas City (Mo.) Railways indicates that the wages paid since 1899 have certainly increased at least step by step with the rise in the cost of living. In other words, they allow a standard of living equal to that enjoyed by electric railway employees in Kansas City for the last twenty years.

The general conclusions advanced by the company at the recent hearing before the board were stated in the ELECTRIC RAILWAY JOURNAL of Oct. 5, page 629. In the belief, however, that the supporting data will be of value to other companies now dealing with such matters, this paper is presenting herewith some of the material. All of the data cannot be published here, but sufficient matter is printed to indicate the detailed character of the company's very relevant evidence.

TRUE TEST MUST BE OVER A LONG PERIOD

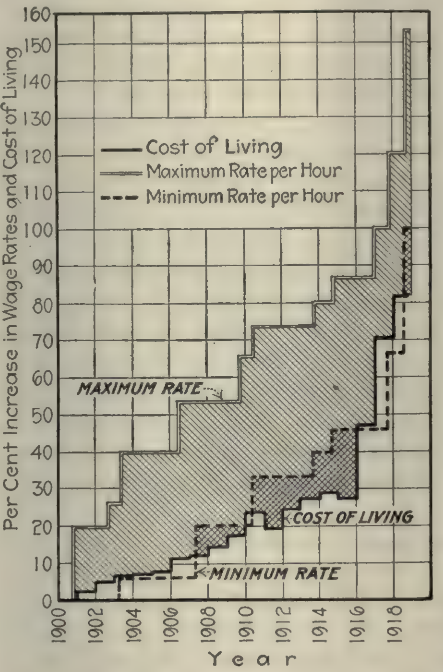
In the opinion of the Kansas City Railways, it is impossible to arrive at any true relation between wages and the advance in living costs by taking a short period as the basis of comparison. Especially is this true of the years during which abnormal war conditions have caused abrupt transitions. The true test is to show over a long period of time the standard of living or the margin between the advance in the cost of living and the advance in wages which any industry has afforded.

The company began its case, therefore, with the presentation of tables showing the increase in the cost of living during certain periods from 1900 to 1918. The year 1915 was used as one division point because the investigation of the Railroad Wage Commission began at this time. The publications of the United States Bureau of Labor Statistics, the report of the Railroad Wage Commission and an inquiry in the Kansas City situation supplied the data upon which the tables were based. The results check very closely, not only with one another but with the increase estimated by Messrs. Mahon and Vahey in the brief for the Amalgamated Association of Street & Electric Railway Employees in the Cleveland and Detroit cases before the War Labor Board.

Table I is a comprehensive review of the increase of 27.94 per cent in the cost of living from 1900 through 1915. The data upon which this computation was based are given in the footnotes. The table was weighed in accordance with the recommendations of Mr. Mahon in arbitration cases.

The increase in the cost of living since 1915 was determined from the report of the Railroad Wage Commission with such corrections, as for rent, as applied to Kansas City. The report, it is said, is recent and authoritative, and has been used both by various railways and the Amalgamated Association in the hearings before the War Labor Board. Table II, taken from this report, gives the commission's method of weighing, which varies slightly from that used by Mr. Mahon. This table indicates the advance in prices for the principal items of expenditure for the Eastern, Southern and Western I. C. C. classification groups and for the entire United States, from December, 1915, to January, 1918.

It will be noted that the increase in the cost of living for the Western territory for this period is 34.72 per cent, as compared to 39.4 per cent for the Eastern territory and 38.12 per cent for the entire United States. This shows that the increase in the cost of living for Kansas City is 3.4 per cent less than for the entire United States, and 4.7 per cent under that of the Eastern territory. Table III shows the increase in the cost of living for Kansas City for the same period--January, 1916, to January, 1918--with these differences. The weights are those proposed by Mr. Mahon, and no increase is allowed for rents. This method gives a 33.5 per cent increase for the period as compared to 34.72 per cent for the Railroad Wage Commission investigation. Applying this increase to the result obtained in Table I brings the increase in the cost of living for Jan. 1, 1918, over 1900, to 70.88 per cent.



Relative Percentage Increases in Cost of Living and in Maximum and Minimum Wage Rates of Kansas City Railways from 1900 to July, 1918.

To bring the data down to date the company exhibited Table IV, which is a combination of Table I and Table III. It shows the per cent increase in July over Jan. 1, 1918, to be 6.34 per cent; over Jan. 1, 1916, 41.9 per cent, and over 1900, 81.63 per cent. The increase of 41.9 per cent in July, 1918, over Jan. 1, 1916, checks very closely an analogous finding of 41 per cent by the Railroad Wage Commission. Moreover, in the Cleveland and Detroit cases Messrs. Mahon and Vahey estimated an increase of 42 per cent for a similar period. Since the Kansas City district is on an average 4.7 per cent under the Eastern territory, the union's estimate reduced by this amount would give 37.3 per cent.

The company then took up the question of the rela-

TABLE I—INCREASE IN THE COST OF LIVING IN KANSAS CITY FROM 1900 TO 1915, INCLUSIVE

Year	Food *Weight 46.5 Index Number 1915 Base	Food *Weight 46.5 Per Cent Increase Since 1900	Clothes and Clothing *Weight 14.5 Index Number 1915 Base	Clothes and Clothing *Weight 14.5 Per Cent Increase Since 1900	Rent Weight *21 Per Cent Increase Since 1900	Fuel (Coal) *Weight 4.9 Index Number, 1915 Base	Fuel (Coal) *Weight 4.9 Per Cent Increase Since 1900	Cooking and Lighting (Gas) Weight *2.6 Per Cent Increase Since 1900	Sundries Weight *10.5 Per Cent Increase Since 1900	Weighted Per Cent Increase: Food Per Cent Increase Since 1900	Weighted Per Cent Increase: Clothes and Clothing Per Cent Increase Since 1900	Weighted Per Cent Increase: Rent Per Cent Increase Since 1900	Weighted Per Cent Increase: Fuel (Coal) Per Cent Increase Since 1900	Weighted Per Cent Increase: Lighting and Cooking (Gas) Per Cent Increase Since 1900	Weighted Per Cent Increase: Sundries Per Cent Increase Since 1900	Per Cent Increase in cost of Living
1900	64	0	89	0	0	91	0	0	0	0	0	0	0	0	0	0
1901	69	8	82	—8	0	91	0	0	1	372	—116	0	0	0	10	2.66
1902	72	12	84	—5	0	95	4	0	2	558	—72	0	20	0	21	5.27
1903	72	12	89	0	0	111	22	0	3	558	0	0	108	0	31	6.97
1904	73	14	89	0	0	102	12	0	4	651	0	0	59	0	42	7.52
1905	73	14	92	3	0	96	5	0	5	651	43	0	25	0	52	7.71
1906	76	19	98	10	0	95	4	0	6	883	145	0	20	0	63	11.11
1907	79	23	104	16	0	99	9	—75	7	1,069	232	0	44	—195	73	12.23
1908	84	31	95	7	0	99	9	—75	8	1,441	101	0	44	—195	84	14.75
1909	87	36	99	11	0	97	7	—75	9	1,674	159	0	34	—195	94	17.66
1910	92	44	100	12	0	99	9	—75	10	2,046	174	0	44	—195	105	23.74
1911	90	40	96	8	0	100	10	—75	11	1,860	116	0	49	—195	115	19.45
1912	96	50	99	11	0	100	10	—73	12	2,325	159	0	49	—190	126	24.69
1913	99	54	100	12	0	104	14	—73	13	2,511	174	0	69	—190	136	27.00
1914	102	59	99	11	0	102	12	—73	14	2,743	159	0	59	—190	147	29.18
1915	100	56	100	12	0	100	10	—73	15	2,604	174	0	49	—190	157	27.94

Food Prices: Changes in food prices are based on tables of relative retail prices of food for the North Central district, weighted according to the average consumption of food in workingman's families. (United States Bureau of Labor Statistics —Bulletin 156, page 382, and Bulletin 197, page 22.)

Clothing Prices: Changes in retail prices of clothing are based on tables of wholesale prices of cloths and clothing furnished by United States Bureau of Labor Statistics (Bulletin 200, page 12). These changes in wholesale prices correspond practically with changes in retail prices as shown by comparison of index numbers of wholesale and retail prices, except that wholesale prices fluctuate in greater degree and respond more quickly to change-producing influences.

Rent Prices: No advance in rentals is shown, in accordance with the following quotation from a letter from Ward C. Gifford, executive secretary of the Real Estate Board of Kansas City, in reply to a request for information: "It is my opinion, based on information from real estate men, members of our board, who have been in the rental business for the past twenty years, that there has been no appreciable advance in rentals for detached houses in Kansas City during the period from 1900 to 1918. This situation is not true, however, as I understand it, in other cities."

Fuel Prices: Changes in retail prices of fuel are based on retail prices of bituminous coal for the North Central district, furnished by the United States Bureau of Labor Statistics (Bulletin 197, page 29). Changes prior to 1907 are based on changes in wholesale prices of bituminous coal furnished by the United States Bureau of Labor Statistics (Bulletin 200, page 217). Wholesale prices correspond in a general way with the retail prices for corresponding years, though the percentage of fluctuation is greater. Changes in price from 1911 to 1915 were checked against actual prices in Kansas City secured from dealers and are correct.

Lighting and Cooking (Gas): Changes in retail prices of gas used for cooking and lighting are based on data furnished by the Kansas City Gas Company.

Sundries: According to the Railroad Wage Commission, this item includes the following, weighted as indicated: Insurance, 14; Organization dues, 10; religion and charity, 6; house furnishing, 13; books and papers, 4; amusements and vacations, 10; liquors and tobacco, 15; sickness and death, 11; all other items, 17; total, 100. The items vary with the standard of living and with one or two exceptions increased little if any during the period from 1900 to 1915—prior to the war. As indicated by wholesale price lists of the United States Bureau of Labor Statistics, household furnishings decreased over 8 per cent (Bulletin 200, page 13); tobacco increased approximately 14 per cent (Bulletin 200, page 266), and costs of illness (gaged by the price of drugs) increased 16 per cent. There is little or nothing to show any increase in the cost of other items in the period prior to the war. In fact, many of them, such as amusements and papers, decreased. Based on the foregoing an arbitrarily estimated increase of 15 per cent was allowed in the cost of sundries. This is not intended to cover any advance in the standard of living.

* Weights used (recommended by W. D. Mahon, international president Amalgamated Association of Street & Electric Railway Employees), correspond practically with weights established by the Railroad Wage Commission's investigation of 265 family budgets for families with incomes up to $1,000, both in 1915 and 1917, for the Western District. The Mahon weighting will tend to show a greater increase in the cost of living on account of the heavier weight given "food," which item shows the greatest advance.

tive increases in the cost of living and in wages. The comparison naturally fell into two divisions, from 1900 to 1917, and from 1917 to the present time. The reason for this is that in 1917 collective bargaining and negotiations with the men established a base for comparison.

The fact that living costs were covered by wages in 1900 and thereafter, the company averred, is shown by several indications. During this period, for example, it at all times was able to maintain a sufficient force for its operations. There was a steady stream of applications at the employment office, showing that the wages paid were continuously sufficient to attract men from other occupations. Of the employees in train service who had been with the company longer than one year, 70 per cent had been in the service for more than five years.

From 1910 to 1915 the average number of resignations per month fell from seventy-seven to twenty-six.

TABLE II—RELATIVE INCREASES IN PER CENT, IN SPECIFIED ITEMS OF EXPENDITURE AS DETERMINED BY THE RAILROAD WAGE COMMISSION

	December, 1915, to January, 1918: Eastern	Southern	Western	United States
Food	52	56	47	52
Rent	15	5	7	10
Clothing	43	50	41	44
Fuel and light	37	25	27	31
Sundries	35	35	35	35
Cost of living increase weighted for incomes from $600 to $1,000	39.4	39.22	34.72	38.12
Cost of living increase weighted for incomes from $1,000 to $2,000	38.35	38.15	34.08	37.15

TABLE III—INCREASE IN KANSAS CITY COST OF LIVING FROM JAN. 1, 1916, TO JAN. 1, 1918

Item	Weight (Mahon)	Per Cent Increase	Weighted Per Cent Increase
Food	46.5	47	21.87
Rent	21.0	..	.....
Clothing	14.5	41	5.94
Fuel and light	7.5	27	2.02
Sundries	10.5	35	3.67
Per cent increase in cost of living over Jan. 1, 1916			33.50
Per cent increase in cost of living over 1900			70.88

TABLE IV—INCREASE IN KANSAS CITY COST OF LIVING FROM JANUARY, 1918, TO JULY, 1918

	Weight (Mahon)	Per Cent Increase	Weighted Per Cent Increase
Food	46.5	None	None
Rent	21.0	None	None
Clothing	14.5	20	290
Fuel and light	7.5	25	187
Sundries	10.5	15	157
Per cent increase in cost of living over Jan. 1, 1918			6.34
Per cent increase in cost of living over Jan. 1, 1916			41.9
Per cent increase in cost of living over 1900			81.63

Food: Comparison of food prices from January, 1918, to June, 1918, shows that the peak of high prices in the United States was reached in February, 1918, and after that prices fell off slightly. The last official figures published (May 15, 1918) showed prices still below those of January. Official Kansas City prices for May 15, 1918, were approximately 1 per cent lower than in January.

Rents: Detached houses showed no increase in rent.

Clothing: An estimated increase of 20 per cent in clothing is allowed from January to July, 1918, based on a 15 per cent increase from the spring price of trainmen's uniforms ($26.50) to the fall price ($30.00). This is thought to be liberal, as it is based on the price of woolen clothes. Shoes are said by a representative clothing firm to have advanced approximately 15 per cent in the same period.

Fuel and Lights: Cherokee lump coal, one of the most commonly used bituminous coals in Kansas City, advanced from $6.55 for 1917-18 to $6.85 in July, an increase of 5 per cent. Gas, which may be used to make approximately 20 per cent of the fuel and light budget, advanced 100 per cent. Fuel and light advanced approximately 25 per cent.

Sundries: A 12 per cent advance in the price of sundries is allowed, bringing the total advance in sundries since the beginning of the war up to 50 per cent. This estimate is corroborated by other investigations.

Owing to the draft and war conditions, these resignations increased in the early part of 1917 to 115 per month, but since the wage increase of July 16, 1917, they have fallen to an average of eighty-five per month. The number of applications has risen from an average of 325 for the six months preceding July, 1918, to an average of 612. In other words, the recent wage increase was sufficient to attract an increase of almost 100 per cent in applications in spite of labor conditions caused by the war.

As further evidence that living wages were paid in 1900 and thereafter, the company showed that more than 42 per cent of its employees either own outright or have an equity and are paying on real estate, and 33 per cent of them live in their own homes. Had the wages paid in the past been inadequate, such a condition would have been an impossibility.

The general record of the Kansas City wage and cost-of-living situation was presented in the form shown in Table V. This indicates that in the period from 1900 to July, 1918, wages were increased 146 per cent as compared to a corresponding rise of 81.63 per cent in the cost of living. Information of a similar sort, but showing the record for maximum and minimum wage rates, is presented in the chart on page 740.

Taking the increase of 41.9 per cent for the Kansas City district from January, 1916, to July, 1918, the company applied this advance to the wage scale in effect in January, 1916, and obtained results approximately the same as the present wage scale. In fact, the average calculated result was 37.03 cents an hour as compared the present actual average of 36.9 cents an hour. It was pointed out, too, that the increase of 41.9 per cent in the cost of living, while checking with the 42 per cent estimate of Messrs. Mahon and Vahey for Detroit and Cleveland, was too high on the basis of the geographic differential reported upon by the Railroad Wage Commission.

TABLE V—COMPARISON BETWEEN INCREASE IN LIVING COST SINCE 1900 AND INCREASE IN KANSAS CITY RAILWAYS WAGES

Year	Per Cent Increase in Cost of Living Over 1900	Per Cent Increase in Wages Over 1900
1900	0	0
1901	2.66	16
1902	5.27	20.6
1903	6.97	33⅓
1904	7.52	33⅓
1905	7.71	33⅓
1906	11.11	41
1907	12.23	43
1908	14.75	43
1909	17.66	49
1910	23.74	60
1911	19.45	60
1912	24.69	60
1913	27.00	67.3
1914	29.18	74
1915	27.94	74
December, 1917	70.88	112.6
July, 1918	81.63	146

TABLE VI—RESULT OF CENSUS AMONG KANSAS CITY RAILWAYS EMPLOYEES IN AUGUST, 1918

	All Employees	Trainmen
Number reporting	2,782	1,342
Number single	745	294
Per cent single	26	21
Number married	2,037	1,048
Per cent married	74	79
Average number of children per family	2	2.6
Average number of children at home per family	1.4	1.6
Average size of family at home	3.4	3.6
Average number of children attending school per family	0.8	0.7
Number families reporting children employed	387	172
Number children employed	694	291
Average earnings of children employed per month	$44	$50
Average monthly complementary earnings per family with children employed	$79	$86
Average length of service (years)	6	6.9
Number owning homes	405	180
Per cent of total	14	13
Number paying for homes	521	255
Per cent of total	19	19
Average monthly payments	$18.35	$19.06
Number owning other real estate	271	184
Per cent of total	9	14
Number owning or paying for real estate	1,197	619
Per cent of total	42	46
Number renting	1,668	868
Per cent of total	60	64
Average monthly rent	$15.16	$15.60

TABLE VII—PREVIOUS OCCUPATIONS OF 1,000 TRAINMEN OF KANSAS CITY RAILWAYS

Farming	512
Clerks	102
Railroad work	73
Laborers	63
Teamsters	25
Chauffeurs	20
Carpenters	18
Mechanics	18
Soldiers	17
Draymen	16
Packing house	16
Firemen	16
Paper hangers and paperers	13
Waiters	11
Blacksmiths	10
Police	10
Millers	9
Electricians	8
Dairymen	9
Bakers	9
Barbers	7
Miners	7
Butchers	7
Mail service	4
Total	1,000

In connection with its case the company presented the results of a questionnaire which its 2782 employees filled out in August. Some of the matter, showing vital statistics and previous employments of trainmen, is published herewith in Table VI and Table VII.

War-Time Changes in Living Costs

Taking into consideration all the factors of the problem, the National Industrial Conference Board, 15 Beacon Street., Boston, Mass.—a co-operative body composed of representatives of national industrial associations—concludes that for the great majority of American communities the average increase in the cost of living between July, 1914, and June, 1918, lies between 50 per cent and 55 per cent. This conclusion is supported by a detailed eighty-two page study, published in *Research Report No. 9* (price, $1).

In amplifying its conclusion the report states that clothing showed the most marked advance among the major items in the budget, the rise being 77 per cent. Quantitatively, however, this was less important than the 62 per cent increase in the cost of food, since food represents about 42 per cent of the average expenditure while clothing represents only 13 per cent.

In certain localities, particularly where there have been unusual advances in rent, the increase in the budget as a whole was somewhat greater than above noted. Since rent requires about 18 per cent of the ordinary family expenditure, each further increase of 5 per cent means an addition of 1 per cent to the budget. Thus the board's estimate can be adjusted to fit communities with unusually large rent increases. Similar adjustments to allow for local conditions affecting the cost of fuel, it is said, would not result in an important modification of the general average.

War Record of the Liverpool, England, Tramways

The Liverpool (England) Corporation Tramways had 2700 employees when the war broke out in 1914, and of that number 2200 have already left to join His Majesty's forces. Vacancies thus created have been filled as far as possible either by men incapable of military service or by women. Viewing the problem as a whole, the company feels that the new employees, especially the women, have rendered useful service to the community by coming forward at a time of great national stress and undertaking duties which, prior to this emergency, were considered to be unfit for them. Had this new class of employees acted otherwise, the tramway facilities throughout the country would undoubtedly have had to be materially restricted.

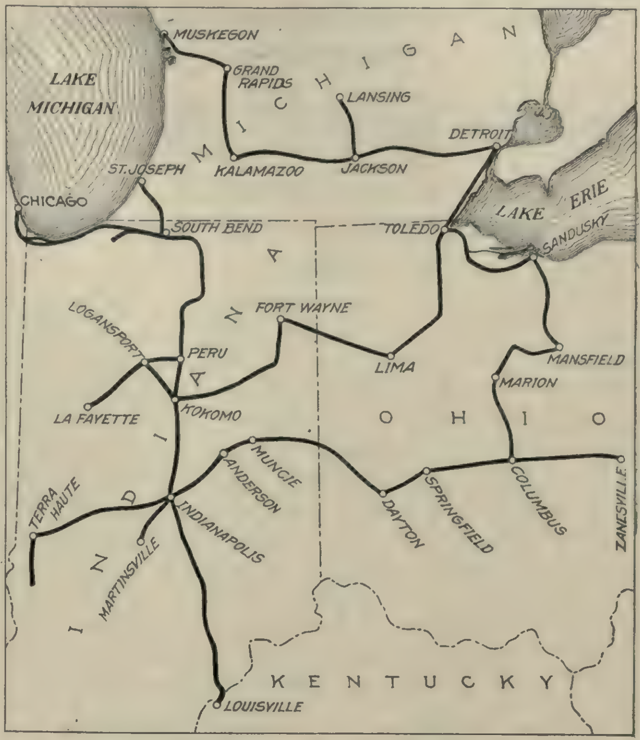
Co-operation Between Middle West Railways and U. S. Navy

Naval Train Travels 2500 Miles Over Thirty-Eight Electric Lines on a Tour of Patriotism and Propaganda

AN ILLUSTRATION of the desire of electric railways to co-operate with the government in every possible way is furnished by the tour, recently completed, of a special train fitted up at the Great Lakes Naval Training Station. The train consisted of three flat cars, loaned by the Chicago, North Shore & Milwaukee Electric Railway, Highwood, Ill., and fitted up at the station in replica with a submarine, a destroyer and a submarine chaser respectively. The train was originally built for use on a recruiting tour, for which purpose it proved very helpful. The later tour was undertaken as a patriotic publicity venture and in a period of six weeks 400 cities and towns, ranging in population from 300 to 500,000, were visited. The total distance covered was 2500 miles and the train was drawn over the lines of thirty-eight electric railways. The party accompanying the train was in charge of Lieut. H. B. Childs from the Chicago Naval Recruiting Station and consisted of a medical officer and a crew of fifty men from the Great Lakes Naval Training Station, including a band of twenty-six pieces, a drill squad and maintenance crew of twenty men, two speakers, a chief petty officer and a hospital clerk. Chief Yeoman L. R. Brown acted as advance agent, preceding the party by two or three days and making all arrangements with the railway companies, hotels, city authorities and newspapers. The public manifested great interest in the venture and thronged to hear the speakers and musicians.

On each electric line the company furnished a coach in which the party could ride and in general the train was drawn by a regular interurban motor car.

Although the three float cars were equipped with standard steam railroad wheels, comparatively few difficulties in operation were encountered. The most serious one was due to the fact that the deep flange of the wheels often caused the car to ride on the groove of the rails or on the paving, producing occasional derailment at switches, particularly at those of the spring type. In a few cases a sharp city curve gave a little trouble, but after a short time the members of the party learned how to extricate themselves from difficulty without much help from the railways.



OUTLINE MAP SHOWING ROUTE OF THE NAVY PUBLICITY TOUR

Comfortable Shelter at Pensacola

A neat shelter of brick, wood and tile was erected last year by the Pensacola (Fla.) Electric Company at Palafox and Gregory Streets, the passing point of several of its lines. It is furnished with comfortable park benches so that the prospective customer is not only shielded against sun and rain but can also wait for a car with more patience than if he had to stand. The shelter is in full harmony with the parked streets characteristic of this attractive Florida city.

NAVY PUBLICITY TRAIN OF DESTROYER, SUBMARINE AND SUBMARINE CHASER

Some Crying Needs of the Safety Movement*

The Author Visualizes a Wide Field in Humanity Conservation and Tells What is Being Done on His Home Property

By R. N. Hemming
Superintendent of transportation Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.

THE paramount question of the hour, to us as individuals and also as representatives of public service utilities and as a nation, is the conservation of humanity. Our government is spending $550 every second in the world war to make the United States and the rest of the world a safe place in which to live, and to teach all people everywhere the spirit of unselfishness. This same spirit should be that of every man, every public service industry, every political and civic organization, who should be working to promote safety first and the preservation of mankind. True, some progress has been made, but as a matter of fact we have only scratched the surface of this matter. The general attitude is indicated by the fact that 82 per cent of the value of combustible property is insured against fire, but only 7 per cent of the economic value of human life is covered by insurance.

Before safety first can be made a success there must be closer co-operation between transportation companies and industries of every character, the public and its official representatives. The public conscience must be awakened by the use of every known means of advertising, through which knowledge of the staggering aggregate of accidents can be spread.

Advertising Safety More Widely

The article by Gerald Stanley Lee in the *Saturday Evening Post* of Aug. 10 has application in the safety field. Mr. Lee advocated winning the war three years sooner by the use of a national billboard. Imagine what could be accomplished in accident reduction through such a scheme. I want to suggest that we make a nation's safety-first billboard out of every theater curtain, program and billboard throughout the country. Every business card could carry a line or two on the subject, and every newspaper and periodical published could bring before its readers such material as is published by the National Safety Council.

We need volunteers who will gratuitously devote pages to safety, by means of reading matter and through illustrated cartoon bulletins, etc. Too much stress cannot be laid upon keeping the subject before the entire population of the country. Think of the millions of dollars being spent for advertising merchandise compared with the paltry sum being spent in accident prevention.

I think that safety museums should be established in all large cities, say in cities of 25,000 and more. Traveling museums on our railroads might also be effective. We also need a universal car stop sign which would be just as well known and symbolic as the Western Union or Bell Telephone sign. We need a standardization of traffic rules and regulations. We need in each community a local safety council consisting of members of various organizations, such as the chamber of commerce, the police department, the fire department, the automobile clubs, the electric railways, etc. Through the medium of an organization of this kind many local problems can be worked out. Such an organization should work in conjunction with the National Safety Council. We need some "ten-minute men" to preach the gospel of safety first; men in each community to visit factories, schools, churches, theaters, etc.

I believe that much can be accomplished in every community by a traffic survey of its accident problems, by classification of the various kinds of accidents and careful study of the data. Such records will be effective in dealing with the traffic departments of cities.

Safety on the Fort Wayne & Northern Indiana

We have organized in the transportation department of the Fort Wayne & Northern Indiana Traction Company an organization for the purpose of furthering the movement in that department. We have appointed team captains on each of our city lines, and the interburban lines are divided up into sections with a team captain in charge of each. These captains have been appointed for six months, but later the trainmen will elect their own captains. Each team captain is to wear on his sleeve a diamond-shaped insignia with the letter "C" and it is his duty to watch for infraction of rules and safe practices. Periodical meetings are held with these team captains, and I find it very effective to mail periodically to their residences suggestions on safety first typewritten on Western Union Telegraph blanks. A sample "telegram" follows:

> Capt. Richard Roe:
> The best safety device known is a careful man. Carelessness does more harm than the want of knowledge. Caution all of your men to make their foundation out of safety-first concrete, properly mixed with an abundance of common sense. Help us reduce accidents by getting your trainmen imbued with the spirit of safety-first and precaution.

Each line is competing against the other lines for a pennant to be awarded to the line having the fewest accidents. The pennant will be carried for thirty days until awarded for the next succeeding thirty days.

I have in mind staging in various theaters a living object lesson in safety first by securing the services of boys and girls who have lost arms, legs or eyes, or who have suffered other marks and visible disabilities through accidents, regardless of how they occurred. Each is to have a letter pinned in front, the whole spelling out "Safety First." Each will recite a stanza of appropriate character beginning with the letter which he carries.

"Knocking Down" Fares in Germany

According to the newspapers, great indignation has been aroused in Berlin by the decision of the Grosse Berliner Strassenbahn to install its own detective force for the purpose of catching passengers who endeavor to evade fare payments. The sleuths are to have the power to exact a fine on the spot for each offense. A German paper is quoted as follows: "The tramway monopoly only wants to enrich its already bulging treasury. It talks about the increased upkeep of rolling stock. We have to ride now in ramshackle old rattletraps called cars."

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*Abstract of paper presented before the Seventh Annual Safety Congress, St. Louis, Mo., Sept. 19, 1918.

Non-Essential Jitneys Must Go

Jitneys Are Declining but Nearly 6000 Still Steal Railway Business—Highways Transport Committee Disapproves of Wasteful Competition and Favors Fullest Use of Electric Lines for Passengers and Freight

TWO important developments have come to pass in the last few weeks—developments that have a most direct bearing upon the complete utilization of electric railway resources in the nation's interests. In the first place, the highways transport committee of the Council of National Defense has expressed its desire to co-operate closely with electric railways and other means in order to secure the most efficient, prompt and economical transportation. In the second place, there are evidences that this committee and various government agencies are beginning to realize the non-essential character of the jitney and to see that, although these are declining in number, no time should be wasted in suppressing entirely all useless competition with existing electric railways.

CO-OPERATION IS THE WATCHWORD

A short time ago the highways transport committee issued an organization plan which included as one of the statements of purpose the following:

> It is the aim of our committee to co-operate closely with railroad, electric railway and waterway transportation, and it is to be clearly understood that in no way is the committee encouraging competition between the various forms of transportation, but rather the carrying of any type of freight by the particular means which can do it the most efficiently, quickly and economically.

The Electric Railway War Board, in commenting upon this statement in a letter to Roy D. Chapin, chairman highways transport committee, said in part:

> Such a policy will meet with the approval of the Electric Railway War Board and is in line with what Mr. Willard was pleased to call "co-ordination of transportation." Before he left the advisory committee of the Council of National Defense, he outlined a plan whereby the electric railways could be utilized for relief of freight congestion.
>
> He also made reference to the ability of the motor truck to assist the electric railways by serving as a collector and feeder and jointly to perform a valuable service to the country in the relief of the steam roads and thereby facilitate transportation.
>
> We believe that the nation's transportation needs will be met only through the most effective co-ordination and functioning of all forms of transportation up to the limit of their capacity, and this board shall be pleased to co-operate in any movement aimed to bring this about.

As a result of this letter E. C. Faber, manager of the War Board, was invited to address the regional and state chairmen of the countrywide organization of the highways transport committee at their convention in Washington a few weeks ago. The following statement from the Oct. 12 bulletin of the committee illustrates the progress made since then:

> Our committee has been making a special effort to co-operate with electric railways. The Illinois State committee, for instance, has worked out a plan of co-operation with electric lines running out of Chicago. A regular service with motor trucks has been started to make deliveries until late at night to electric lines, which in turn make early morning deliveries in other towns.

The War Board has been endeavoring for the last few months to eliminate jitney competition with electric railways through some governmental action on the grounds that these competitors are non-essential to the winning of the war and are performing a service that is wasteful of man power and materials. With this in view the board appealed to the Provost Marshal General to have them placed under the "work or fight" order; it submitted data to the Fuel Administration showing that jitneys are wasting man power, gasolene and other essential materials, and it took up the question with the War Industries Board, the Housing Commission, the Shipping Board, the Motor Transport Committee, the Railroad Administration and the Secretary of Labor.

In accordance with a request for exact information, the War Board sent out a questionnaire, the results of which are being communicated to the various government agencies. The table on page 746 shows in detail the present status of jitney competition. The situation was well summarized in a letter sent by W. V. Hill, assistant manager Electric Railway War Board, on Oct. 21 to W. Champlain Robinson, director of oil conservation, United States Fuel Administration.

ALMOST 6000 NON-ESSENTIAL JITNEYS

The data received, according to Mr. Hill, show that there are in 153 cities 5879 jitneys performing non-essential duplicate service. These jitneys employ 8200 persons and consume approximately 21,093,330 gallons of gasolene annually. The amount of lubricating oil used by them is not estimated, but their gross earnings are estimated at $13,720,300. Jitneys numbering 855 are performing a needful service. Replies from 321 electric railways were received. Of these 115 reported jitney operation in their territory, and 206 reported a complete suspension of this class of utility.

At one time there were approximately 20,000 jitneys operating in competition with electric railways. The reasons for the decrease are the increased demand for labor which has enabled the jitney driver to obtain a wage in excess of what he could earn in the jitney business; the requirements of the draft; the increased cost of operation, and the various regulatory enactments by states and cities in some sections of the country.

The electric railways serving the territory where jitneys now operate have indicated that they are equipped to handle the additional traffic now going to the jitneys without appreciably increasing their service. This would result in releasing all those engaged in jitney operations for more essential pursuits and result in the conservation of gasolene, materials, etc.

Hence, Mr. Hill concludes, the jitneys are not essential to the public and should be discontinued entirely where they are performing duplicate service. The fact that they have been entirely eliminated in many cities justifies the contention that they are not considered essential to the public and that their continued operation in other sections of the country is unnecessary.

While the foregoing data were being compiled, the highways transport committee through its secretary,

R. C. Hargreaves, sent to the state and regional chairmen a letter reading in part as follows:

> It seems that when we are called upon by the Labor Department to assist in classifying essential labor, the matter of jitneys should receive careful investigation.
>
> It is, of course, the aim to avoid any duplication of transportation where there are already facilities that can handle such transportation. We can see no reason why our organization should declare essential jitneys which are operating on lines paralleling electric railways, where such railways could handle the passenger traffic.
>
> We realize, however, that there are many jitney lines which are of great benefit to the public because the transportation is the only form of transportation that can be had. In that event these jitneys are performing a very necessary service. Moreover, there are jitney lines which parallel the electric railways for only a short distance and serve a territory which is not served by the electric lines. Where these conditions exist they would not, of course, be considered in the same light.
>
> While our committee is called on to strengthen transportation resources, we must also help conserve the gasoline supply, so that some investigation should be made of this situation in your territory, with the view of bringing out a policy which is in harmony with not only the essential labor program but the conservation of gasolene.

No one in the highways transport organization, it is now said, has been found who is not willing to co-operate with the War Board and do everything possible to assist it. Some of the replies received from the state and regional chairmen indicate that the jitney is not a local factor. Jitneys have been eliminated, it is asserted, entirely in Nebraska, Utah and Wyoming, and nearly so in Ohio. In Oregon there are few lines that could be deemed in competition with established steam or electric carriers, and no encouragement is given to competition where railway service is satisfactory.

In Oklahoma jitneys are regularly operated in only two cities, and then by the city governments as necessities. In California jitneys are reported to be in a process of elimination, but the State highways transport committee is looking fully into the matter. The conditions in Texas are similarly under investigation. In Wisconsin the situation is not so bad as formerly, although it is admitted that jitneys in Milwaukee are probably adversely affecting electric railway revenues. The matter may come before the Legislature in January.

In Colorado the electric railways, it is averred, are in a better situation in respect to the jitneys than in any other state. So far as can be ascertained, not a single jitney is operating in Colorado in competition with electric railways in purely intra-urban traffic.

JITNEYS OPERATING IN UNITED STATES IN OCTOBER, 1918

	Number Operating on Routes Where Electric Cars Run	Estimated Number of Men Employed	Estimated Annual Earnings	Number Operating Where Electric Cars Do Not Run
Arizona:				
Douglas	50	55	$250,000	None
California:				
Southern Cities	166	350	650,000	88
Oakland	30	32	75,000	None
San Francisco*	250	300	500,000	None
Connecticut:				
Norwich	69	70	90,000	None
Waterbury	5	5	20,000	None
New Haven Bridgeport and vicinity	579	700	1,856,000	*a* 49
Colorado:				
Durango	..	..	.....	*b* 25
Florida:				
Miami	15	25	16,000	None
Georgia:				
Columbus	20	30	72,000	None
Savannah	*c* 40	50	30,000	None
Augusta		..	....	*d* 50
Indiana:				
South Bend	*e* 27	50	112,000	None
Evansville	2	2	4,000	None
Kokomo	30	50	78,000	None
New Albany	31	31	56,500	None
Indianapolis	35	50	50,000	None
Terre Haute and vicinity	80	100	110,000	None
Anderson	38	39	105,000	None
Marion	25	27		
Muncie	12	13		
Elwood	4	4		
Fort Harrison	10	11		
Gary	76	100	130,000	None
Illinois:				
Rockford	40	60	200,000	*f* 360
Springfield	*g* 25	40	75,000	None
Chicago Hgts.	6	9	3,000	None
Iowa:				
Sioux City	12	12	40,000	None
Kansas:				
Lawrence	1	1	2,000	None
Wichita	8	15	86,400	None
Kentucky:				
Somerset	14	30	30,000	None
Louisiana:				
Algiers	3	3	3,600	None
Maine:				
Kennebunk	12	12	18,000	None
Showegan	..	.	.....	6
Portland	3	4	9,000	2
Bangor	..	..	.....	3
Maryland:				
Cumberland	..	..	.....	6
Baltimore—Camp Meade	15	20	27,000	None
Kensington	3	3	5,000	None
Baltimore	*h* 34	50	63,000	None
Massachusetts:				
Springfield	120	200	110,000	10
New Bedford	161	200	500,000	None
Plymouth	3	4	9,000	None
Milford	10	16	5,000	None
Lynn	29	29	$84,000	None
Salem	29	29	112,000	None
Gloucester	1	1	1,400	None
Lowell	19	19	32,000	None
Lawrence	247	259	185,000	None
Haverhill	6	6	4,800	None
Brockton	168	176	108,000	None
Quincy	60	60	49,000	None
Hyde Park	2	2	7,000	None
Fall River	94	100	37,000	None
Newport	11	11	2,200	None
Woonsocket	3	3	6,000	None
Attleboro	10	10	20,000	None
Worcester	10	10	15,000	None
Michigan:				
Saginaw	7	10	20,000	None
Lansing	7	7	26,000	None
Battle Creek	50	50	80,000	None
Mississippi:				
Hattiesburg	...	...	....	*i* 50
Missouri:				
Kansas City	200	250	1,000,000	None
St. Joseph	50	75	250,000	None
Excelsior Spgs.	30	45	135,000	None
Joplin	150	170	450,000	None
Springfield	7	14	25,000	None
New Jersey:				
Asbury Park	1	1	2,000	*j* 1
Penns Grove	57	100	48,000	None
Atlantic City	100	100	200,000	*k* None
Newark and vicinity	507	1500	1,750,000	22
Morristown	15	15	30,000	5
Keyport	20	22	37,000	30
New York:				
Watertown	...	..	......	15
Schuylkill	2	2	4,000	None
Ossining	10	15	15,000	None
Albany	*l* 4	6	10,000	None
Buffalo	*m* 10	12	5,000	None
Huntington	4	5	14,000	3
Syracuse	..	..	......	2
Peekskill	20	20	30,000	None
North Carolina:				
Burlington	75	100	100,000	None
Raleigh	2	4	7,000	None
Durham	*n* 40	45	45,000	None
Asheville	10	12	30,000	None
Ohio:				
Tiffin	2	2	2,000	None
Alliance	3	5	9,000	2
Cleveland	*o* 2	2	6,500	None
Ashtabula	4	7	11,600	None
Lancaster	1	1	2,000	None
Springfield	5	5	20,000	None
Columbus	50	60	75,000	None
Pennsylvania:				
Milton	10	12	3,000	None
Punxsutawney	2	2	4,000	8
Danville	..	..	......	4
Williamsport	1	1	1,200	None
Wilkes-Barre	15	25	35,000	None
Harrisburg	69	75	75,000	None
Scranton	2	2	8,500	None
McKeesport	..	..	......	30
Rhode Island:				
Providence	143	175	$300,000	None
Pawtucket	90	110	125,000	None
Woonsocket	40	50	100,000	None
Central Falls	2	3	4,000	None
West Warwick	10	12	20,000	None
South Carolina:				
Charleston	*p* 20	25	......	None
Tennessee:				
Jackson	12	20	20,000	None
Chattanooga	100	125	182,500	None
Nashville	50	75	175,000	None
Texas:				
Paris	1	1	2,000	None
Port Arthur	40	40	18,000	None
Austin	50	50	70,000	None
Wichita Falls	20	35	18,000	None
El Paso	80	175	204,400	28
Temple	25	30	22,000	None
Houston	*q* 375	500	504,000	None
San Antonio	*150	160	275,000	None
Virginia:				
Charlottesville	4	4	8,000	None
Tasewell	3	3	6,000	None
Washington:				
Seattle	125	200	600,000	None
Everett	21	25	125,000	16
Grays Harbor	5	5	5,000	None
Centralia	*r* 4	4	10,000	None
Spokane	3	3	8,700	None
West Virginia:				
Charleston	4	4	10,000	None
Wisconsin:				
Milwaukee	80	85	200,000	None
Racine	10	15	25,000	15
Green Bay	3	5	7,000	None
Eau Claire	9	12	27,000	None
Waupaca	3	4	9,000	None
Total	5,879	8,200	$13,720,300	855

(*a*) These forty-nine jitneys operate a short distance on routes where cars run.
(*b*) Compete during fairs, etc.
(*c*) Operate mostly mornings and evenings.
(*d*) Operate to Camp Hancock.
(*e*) Operate directly ahead of cars.
(*f*) Serve Camp Grant, which electric cars do not reach.
(*g*) Three hundred operate during State Fair week.
(*h*) Owned by electric railway.
(*i*) Operate to Camp Shelby.
(*j*) Eight in summer season.
(*k*) Operate on parallel streets with electric railway cars.
(*l*) Parallel cars part of route.
(*m*) Operate on Sunday only.
(*n*) Charge 25 cents fare.
(*o*) Report of small road.
(*p*) Operate to Navy Yard.
(*q*) Two hundred and fifty cars operate to Camp Logan and aviation camp, both being served by electric lines.
(*r*) Operate between Centralia and Chehalis.
* Estimated.

Changing for Prepayment Operation 198 of the World's Best-Known Cars

IT IS perfectly safe to assert that the cars of the Los Angeles Railway are the best-known in the world, for who, from Africa to Greenland, has not seen them "butt" into many a movie tragedy or comedy?

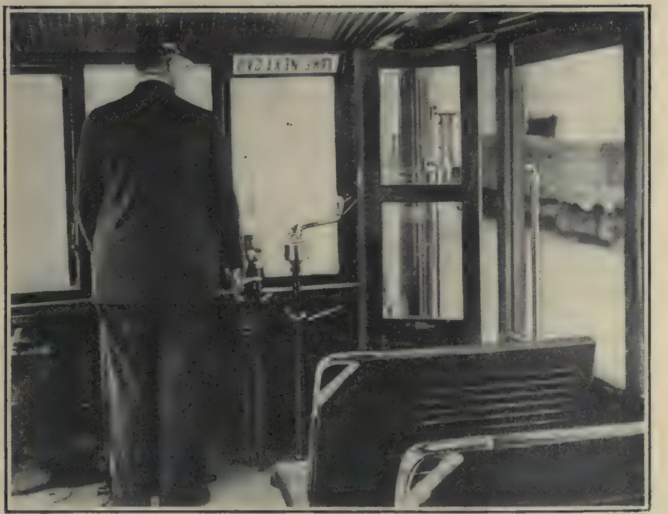
Most of the cars of this company are end-entrance California type—namely, open cross-seat compartment forward for smokers, closed longitudinal seat compartment center and open cross-seat compartment rear. Some 582 cars of this type are arranged for prepayment and are fitted with gates. About three or four years ago, also, the company added 183 center-entrance cars.

Of these cars 198 are now being altered by the addition of doors and side sheathing. These are of the three-compartment type but hitherto have not been operated with prepayment facilities.

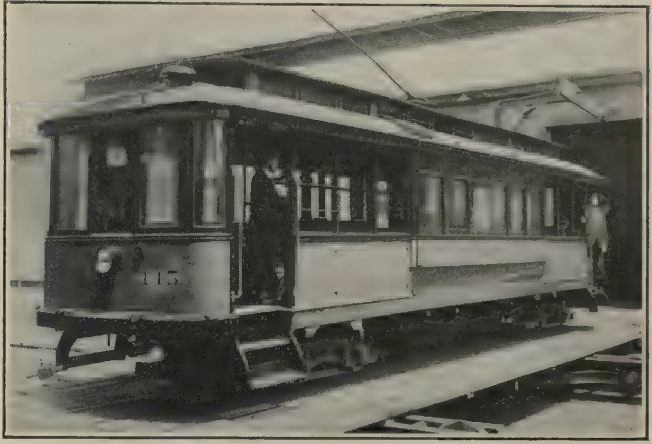
In detail, the changes begun in August, 1917, are as follows:

A two-leaf folding door is installed at both ends of the car and on both sides. In operation, the devilstrip-doors are closed all the time; the rear doors next to the conductor are open all the time for ingress and egress and the front doors to the right of the motorman are opened by him only to permit passengers to leave. Therefore, the only one door operating handle is in possession of the motorman. This handle is simply locked onto the squared top of the round rod which connects with the door levers. This rod is set in a frame directly behind the motorman's valve handle. The conductor now stands back of a rail in a place made by the removal of the last outside cross-seat. The double folding doors are of spruce instead of mahogany, the latter wood being now unobtainable.

The usual metal lattice or grill which formed the sides of the rear outside compartments is being replaced by $\frac{1}{16}$-in. metal sheathing carried up to arm-rest height and stiffened by 2-in. x 2-in. square wooden diagonals. This change will considerably increase the comfort of the rider in cool weather. Up to the present it has been customary to draw the Pantasote curtains down to floor level, but this was not very convenient. Besides, the curtains received a good deal of kicking, salivation and other abuse. Despite constant use and abuse since 1904 the upper parts of the curtains are in such good condition, that they have easily been salvaged to give perfectly good service on the same cars. The present master mechanic, attributes this longevity partly to the quality of the material and partly to the oiling it received regularly whenever the cars came into the shop for painting. As a curtain drawn only to arm-rest height it will receive less abuse and be serviceable for many years more.



TWO-LEAF FOLDING DOOR ADDED AT FRONT END TO PREVENT ENTRANCE



COMPLETE THREE-SECTION CAR WITH NEW SIDE SHEATHING

The foregoing changes in car construction, using doors ready-made from the company's own millroom, average ninety-six hours of labor per car.

The company is also removing the lattice work from forty-seven prepayment cars built originally in 1896 and converted during 1906 and 1908 when Pantasote floor curtains were installed. These curtains are also being salvaged.

Within the past two years, the Los Angeles Railway has painted some fifty cars with the modern enamel process, using both Sherwin-Williams and Pratt & Lambert materials. The saving over varnish is about $8.50 per car in material and seventeen hours in labor time.

Tank Sells Bonds in Allentown

THE greatest single factor in the successful prosecution of the Lehigh County campaign for the Fourth Liberty Loan has been the co-operation of the Lehigh Valley Transit Company, according to Chairman Reuben J. Butz, of the Executive Committee, Allentown. This co-operation assumed the form of supplying the Liberty Loan organization with a "Liberty Tank" and the services of a crew to operate the tank. Meetings were held every afternoon and evening in different sections of the county, and the tank invariably proved a magnet to attract a large crowd of people. Talks were made from the monitor decks of the tank.

The tank was built on a railway flat car, and painted a battleship gray. It was 41 ft. long, 8 ft. wide and 11 ft. high. It was equipped at either end with a powerful searchlight, and in the evening was ablaze with 300 25-watt lights. Cannon projected from the turrets on either side as well as in front. All in all, the tank made a formidable appearance, while the finishing touch was given by the likeness of a spunky cat on top, spitting out, "Treat 'Em Ruff." A large bell announced the approach of the Liberty tank.

Electric Road Helps Relieve Freight Congestion

By JAMES W. BROWN
Superintendent of Shops, Wilkes-Barre & Hazleton Railway

THE Wilkes-Barre & Hazleton Railway handles quite an extensive freight business in carload lots. It has a connection with the Lehigh Valley Railroad at the Wilkes-Barre and Hazleton junction about 4 miles from Hazleton and also with the Central Railroad of New Jersey at Ashley Junction in Wilkes-Barre. Local freight is also handled at the Wilkes-Barre and Hazleton terminals.

This freight is of a miscellaneous character such as is usually handled by the steam roads and is carried by the electric road in the night time. A 60-ton electric locomotive shown in an accompanying illustration coupled to a caboose is used for this service. This locomotive was built by the General Electric Company and the American Locomotive Company and is geared to handle heavy trains at low speed. It has a steel cab mounted on two articulated trucks. The equipment consist of four GE-69-C, box-frame, 600-volt motors and is of sufficient capacity to start a 350-ton train on a 3-per cent grade. General Electric type-M multiple-unit control is provided.

LOCOMOTIVE AND HOMEMADE CABOOSE USED BY THE WILKES-BARRE & HAZLETON RAILWAY FOR FREIGHT SERVICE

The four-wheel caboose used in this freight service was built in the shops of the Wilkes-Barre & Hazleton Railway. It is 21 ft. 9 in. from center to center of knuckle pins. It has a 9-ft. wheelbase and uses 33-in. cast-iron wheels mounted on M.C.B. 3¾-in. x 7-in. axles.

New Form of Gear Drive for Heavy-Duty Gasoline Trucks

A DOUBLE-REDUCTION gear drive for heavy-duty trucks has been put upon the market by the White Company, Cleveland, Ohio, as a substitute for the chain-and-sprocket drive formerly used. In this there is a first reduction through the bevel gear and drive pinion in the center of the rear axle, from which the power is carried by a live axle of the floating type through the center of the housing to a gear at the rear end of the live axle. This gear meshes with a second gear (carried on the housing of the live axle, but inside the hub case of the rear wheel), and this second gear, in turn, meshes with a ring gear attached to the wheel inside the hub case.

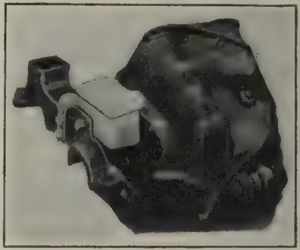
In this manner of applying power to the wheel a second reduction occurs between the three gears and the hub case very similar to the reduction which takes place between the sprocket wheels of the chain drive.

The double-reduction principle has been used with success in the lighter White truck, but a considerable engineering problem was imposed in applying it to shaft-driven heavy-duty trucks without using a large axle housing, without requiring an auxiliary axle, without increasing unsprung weight and without sacrificing simplicity.

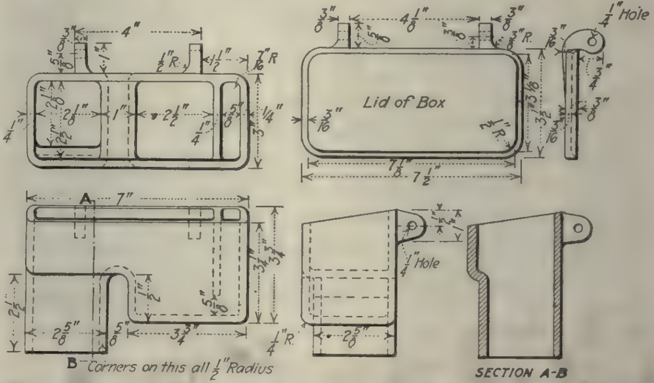
Cast-Iron Oil Box Prevents Hot Bearings

By JOHN B. BLAIKLOCK
Master Mechanic Lincoln (Neb.) Traction Company

THE Lincoln Traction Company has adopted a cast-iron oil box for use with the armature bearings of its GE-52 and GE-54 motors. The company has 168 motors of these types in service, and previous to the adoption of this type of bearing considerable trouble was experienced with hot armature bearings due to the inefficient oiling device of these motors. About sixty of these boxes are now in service and so far we have experienced absolutely no bearing trouble. Some of these motors have been in service with the new type of oil boxes for ten months.


OIL BOXES IN PLACE ON GE52 AND GE54 MOTORS

The idea of the box is not new, but its use with the GE-52 and GE-54 motors embodies some new features. The old oil holes in the bearings and bearing housings were ¾ in. x 3 in. These were enlarged to 2⅛ in. x 3½ in. The bearing shells were cut in a milling machine and the housings were cut out with an oxy-acetylene cutting torch. The box was made to fit snugly into the housing and is bolted thereto with two ⅜-in. machine bolts, and further braced and strengthened by a wrought-iron strap 1 in. x ⅛ in. in size, which is bolted to the side of the case. Accompanying illustrations show the construction of the box and its application to the motors. The box is packed with waste in the usual way and is able constantly to carry about 1½ in. of oil in the oil chamber. The boxes cost 70 cents each, and the machinery and mounting cost $1.50 per motor.



DETAILS OF OIL BOX FOR GE52 AND GE54 MOTORS USED AT LINCOLN, NEB.

American Association News

Program for New York Conference

The program for the conference of the American Electric Railway Association at New York, Nov. 1, has now been completed. It follows:

Morning Session

Address by President John J. Stanley

Report of Electric Railway War Board

Topical Discussion

- ***"The Needs of the Interurban Electric Railway,"*** **by Arthur W. Brady, president Union Traction Company of Indiana**

Afternoon Session

Topical Discussions

- ***"Light-Weight Cars,"*** **by H. G. Bradlee, president Stone & Webster Management Corporation**
- ***"The Zone System,"*** **by Thomas Conway, Jr., Ph. D., Professor of Finance, University of Pennsylvania**
- ***"The Higher Unit Fare,"*** **by L. S. Storrs, president Connecticut Company**
- ***"Public Subsidies,"*** **by Homer Loring, banker, Boston, Mass**
- ***"Public Ownership,"*** **by Richard McCulloch, president United Railways of St. Louis**

"Meralco" Section Discusses Jitneys

AT THE MEETING of the company section held in Manila on Aug. 6 a paper on "Manila Jitneys" was read by J. M. Bury, assistant superintendent of transportation, M. E. R. & L. Co. The paper followed somewhat along the lines taken up by C. Nesbitt Duffy, vice-president of the company, in the interview published in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 20, 1917, page 114.

There are, said Mr. Bury, in Manila and suburbs approximately 4000 carromatas and carretelas (commonly called "street rigs"). These are run in competition with the electric railway and at least 3000 are in regular operation. These vehicles are shown in the accompanying illustrations. The rates by the hour are prescribed by city ordinance. but the drivers do not like this schedule. They are allowed to charge 10 cents for a haul of less than fifteen minutes' duration and are apt to leave their passengers if held too long. They have no regular routes or schedules, but are always to be found where the traffic is most dense. The carromata receipts are from $1.75 to $2.25 a day, and the carretela receipts from $2.25 to $2.75 a day. This totals for the city $6,750 per day, of which at least one-half is derived from traffic which could be conveniently handled by the electric railway. The expenses including driver are about 85 cents per day.

In the discussion of Mr. Bury's paper L. C. Bewsey, carhouse foreman, said that depreciation of horses and vehicles should be added to the cost estimates given, which would reduce the profit to $1.32 per day. His idea of the cause of competition of the sort described is that some people cannot bear to see a corporation making a reasonable income on the money invested. Where the jitneys have been compelled to bear their share of the expense which they cause, and to furnish a reasonable indemnifying bond, they have in many cases been obliged to retire from the field.

F. P. Santiago, assistant claim agent, expressed the hope that the carromata would continue in business, but that in its operation justice would be done to the street railway. The railway might go into the carromata business in competition with the present owners, but the wisdom of this would be questionable; a better way is to obtain co-operation with the city authorities for the regulation of carromata service. The local railway is not operating under any privilege gratuitously obtained from the city of Manila, and is paying a percentage of its gross receipts to the government in addition to several kinds of taxes. It is paving the whole track area for the benefit of the entire population, particularly of automobile and carromata owners. All that the carromata owner does is to pay an internal revenue tax, borrow new harness until it has passed the inspection of the internal revenue agent (using the old harness afterward) and pay a driver's personal tax of $1 a year.

Mr. Bewsey suggested the following requirements as reasonable for carromata owners: (1) Drivers to be not less than eighteen years of age. (2) Drivers to pass mental examination by police authorities and physical examination by a health officer. (3) Strict adherence to traffic rules. (4) Carromatas to be kept in reasonably clean and safe condition. (5) Carromatas to be repainted within reasonable length of time. (6) Carromatas for hire not to be allowed on the most congested streets during morning and evening rush

Buffalo Cart — Carromata — Carretela

THREE SOURCES OF COMPETITION WITH THE ELECTRIC RAILWAY IN MANILA, P. I.

hours. (7) At least one-fifth of 1 per cent of the gross receipts of the carromatas to be collected by the city and used for paving the street area now being paved by the railway.

Mr. Bewsey said there is no competition from the carromata on long hauls. The competition on short hauls can be met by furnishing more frequent car service, which can be done in the following ways: By the use of additional cars. By the use of "special" or "emergency-type cars." By increasing the average car speed. In addition better service would result from: Reduction in number of stopping points. Insistence upon observation of traffic rules by automobile and carromata drivers. Reduction in liberality of trainmen toward passengers who cause unnecessary delay to cars. Promptness by the conductors in giving of starting signals to the motormen.

Keeping Clinkers Off the Boiler Furnace Walls

OWING to the high temperature of the ash in modern boiler furnaces there is apt to be trouble with clinkering, particularly where the ash has a low fusion temperature. Clinker tends to adhere to the furnace walls, and when it does so operating efficiency is reduced and deterioration of the walls is made more rapid.

A plan which has been devised to prevent adhesion of clinker to the walls consists in causing air to emerge from the wall surfaces at the points where clinker tends to form. Where forced draft is used the air for this purpose can be diverted from the regular supply; where natural draft is used the air can be furnished from a fan of moderate size. Suitable passages are provided in the walls, connected with a "wind box" supplied from the air duct. The air, of course, keeps the side walls comparatively cool and thus prevents adhesion of the clinker.

In laying up the furnace wall a thin air chamber is built in back of the first row of bricks facing the fire, and air passages are provided through the brick walls directly into the fuel bed, preferably by proper spacing of the bricks in front of the chamber facing the fuel bed. The openings can be of graduated size so as to deliver the proper relative amounts of air. No openings are allowed above the fuel bed, and only small ones at or near the surface.

In addition to keeping the bricks cool this construction serves the purpose of supplying the fire with some pre-heated air at a point where such seems to be needed. A damper is usually installed at the intake to the chamber permitting a regulation of the flow of air through the openings. Just enough air is admitted to prevent clinker from sticking to the wall.

The plan described is known as the Bernitz method for which the following economies are claimed: (1) Fuel saving by eliminating the burning down of the fire before cleaning and the building it up after cleaning, by shortening the time spent on cleaning walls and dumping fires, by enabling the operator to burn the coke off the clinkers before dumping, by getting more complete combustion from the coal along the side walls on account of the greater cleanliness of grates, by reducing side-wall radiation and by reducing manual labor so that the work attracts a higher class of operators. (2) Increase in boiler capacity by permitting the furnace to be operated more efficiently. (3) Lengthening of period of active operation of boiler. (4) Reduction in strain upon the stoker by the elimination of obstructing clinker.

War-Utility Problems Discussed

THE conduct of utility business under war conditions was the topic of a one-day informal discussion by thirty delegates to the annual convention of the Kansas Public Service Association at Hutchinson, Kansas, Oct. 4. At the meeting it was decided to discontinue the holding of regular meetings throughout the coming year. Since the association will remain in this semi-dormant state it was thought best to continue the present offices in power.

The program included provisions for discussions of fuel costs, other operating expenses, rates and temporary increases, education of the public and new business. There was also considerable discussion on classification of accounts following a report on this subject presented by a committee appointed by the Kansas Public Utilities Commission. It was expected that a proposed classification will be submitted to the commission not later than Nov. 1.

It was reported that the utilities commissioners had expressed recently as the opinion of the commission that utilities in general should be permitted to increase their rates, but that the commission is not inclined to disturb present rates, preferring to add as a war measure certain percentages of increase to the present rates, planning to discontinue these increases six months after peace is declared. It appeared that a number of Kansas utilities will ask for increases on this basis.

On fuel costs it was the consensus of opinion that energy production costs in Kansas ran from 48 per cent to 61 per cent higher than in pre-war days. Taxes have increased an average of 30 per cent, and wages an average of 60 per cent. There was considerable discussion as to the effect of the taking by government employment agents of the labor necessary to the operation of utilities, and a committee was appointed to investigate this matter.

L. O. Ripley, vice-president Kansas Gas & Electric Company, spoke on the subject of public policy, stating that at this time there is an unusual opportunity to educate the public by explaining to the local clientele the conditions under which each utility operates. This, said he, is the time to combat socialistic tendencies by bulletins, talks and advertisements.

The officers who will continue in power for the ensuing year are: President, J. D. Nicholson, Newton, Kan.; secretary-treasurer, W. W. Austin, Cottonwood Falls; executive committee, A. M. Patten, Topeka; L. O. Ripley, Wichita; C. L. Brown, Abilene; H. W. Magruder, Liberal; L. S. Small, Concordia; Walter S. Grundy, Hutchinson.

At the Wolf Street (Syracuse) shops of the New York State Railways the mercury vapor lamps previously used for illumination have been replaced with 250-watt nitrogen-filled Mazda incandescent lamps. These are 150-volt lamps connected four in series on the trolley circuit.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Rhode Island Wage Accepted

Brief Review of the Conditions Fixed by the War Labor Board in Recent Decision

Immediately following the decision in the Rhode Island fare case referred to elsewhere in this issue, the Rhode Island Company, Providence, notified its employees that a new wage scale fixed by the War Labor Board would become effective at once and that the new pay would be found by the employees in the next pay envelope. The men voted unanimously to accept these conditions and show their satisfaction by courteous and unanimous service.

The award of the War Labor Board in this case, of which brief mention was made in the ELECTRIC RAILWAY JOURNAL of Oct. 12, in its general tenor was similar to the previous awards made by this body in the electric railway field. The board saw in the adjustment a matter of national necessity and repeated its previous statement to the effect that "overcapitalization, corrupt methods, exhorbitant dividends in the past are not relevant to the question of policy in the present exigency." It also recommended a reconsideration by the proper authorities of the fare which the company is allowed by law to collect from its passengers. The award as it affects the terms of service of the employees follows:

"The arbitrators are fixing these wages for the period of the war only, and therefore substitute for extended graduation of rates by years a shorter period for the increases.

FORTY-EIGHT CENT MAXIMUM

"The wage schedule to be paid all motormen and conductors shall be:

"For the first three months of service, 43 cents an hour; for the next nine months of service, 46 cents an hour; thereafter, 48 cents an hour.

"Wages of Other Employees—The wages of employees other than motormen and conductors, which are before the arbitrators for fixation, shall be increased by the same percentage that the maximum of the wage scale paid to motormen and conductors is increased by this award; provided, however, that if this percentage does not bring the wage of any adult male employee up to a minimum of 42½ cents an hour, he shall be paid said minimum of 42½ cents an hour, and provided further that where women are employed in the same classification as men they shall be paid equal pay for equal work.

"For the purpose of securing a proper interpretation of this award, the secretary of the National War Labor Board shall appoint an examiner, who shall hear any difference arising in respect to this award between the parties and promptly render his decision, from which an appeal may be taken by either party to the arbitrators making this award. Pending a final adjudication upon the appeal the decision of the examiner shall be binding.

AWARD RETROACTIVE

"This award is to take effect as of July 19, 1918, and shall continue for the duration of the war, except that either party may reopen the case before the arbitrators at intervals of six months, beginning April 1, 1919, for such adjustments as changed conditions may render necessary.

"The company shall be allowed until Dec. 1, 1918, to make the payments to its employees of the back pay due them under this award."

Strike on Ohio Electric Railway

Charles Bendheim, representative of the United States Department of Labor, arrived in Springfield, Ohio, on Oct. 18 to investigate the strike of motormen and conductors of the Ohio Electric Railway. It is the desire of some of those interested that the matter be placed before the War Labor Board, but this cannot be done while the men are on a strike.

All meetings of the men in the various towns touched by the road have been prevented by the health authorities, except at Lima, where they gathered on one occasion to discuss their troubles.

The men demand an increase in wages, improvement in working conditions and recognition of the union. Officers of the company who have received a committee from the strikers claim that recognition of the union has been made a necessary preliminary to the discussion of the other two complaints. They cannot see their way clear to yielding this point. A statement made by the company says:

"The company has not objected to any or all of its employees being members of any order, union or other society, but the company does not feel that the recognition of the Amalgamated Association is a necessary preliminary to fair dealing with its employees as committees or as individuals, or to an equitable adjustment of wages or other questions."

On Oct. 20 the company and its employees reached an agreement to submit the question of increased wages and better working conditions to the Federal War Labor Board for adjustment. The increase in wages which is asked amounts to about 15 per cent. Service was promptly restored in full.

Seattle Details Dragging

Progress Toward Municipal Ownership Slow, but No Insurmountable Barriers Appear So Far

As the last step in closing the deal for the purchase of the railway lines of the Puget Sound Traction, Light & Power Company in Seattle, Wash., the City Council is attempting to segregate the real estate of the company. When the city of Seattle offered to buy the lines for $15,000,000 the company accepted the offer for the railway operating property.

The company contends that certain real estate which city officials say should be included in the deed is not operating property. The disputed property includes the Massachusetts Street freight terminals, Madison Park property, property in Rainier Valley purchased for a right-of-way to build a line to compete with the Seattle & Rainier Valley Railway, but which was never used for that purpose, property on Beacon Hill obtained in the purchase of other railways, and a gravel pit of several acres at Green Lake.

SUITS MUST BE SETTLED

According to Walter F. Meier, corporation counsel, three important suits must be disposed of before the deal for the transfer of the company's property to the city can be made. Two mandamus suits to compel the company to pave between its tracks on certain streets were won by the city and appealed by the company to the Supreme Court. In the Fremont bridge case the city obtained a judgment against the company for $66,414 and an appeal is now pending in the Supreme Court. The third case is an action brought by the company to collect damages from the city on account of an ordinance providing for the sale of tickets on cars. The court decided against the company and an appeal is now pending in the United States Supreme Court.

Representatives of the local railway employees are telling city officials that unless some immediate assurance is given that the city will take over the property in a reasonable time and guarantee the union scale, it will be impossible to hold the men on the cars. The company agreed to pay the new scale from Aug. 1 to Oct. 15, by which time, it was believed, the city would have taken the property over. This agreement expired on Oct. 15 and the wages automatically dropped back from 50 cents and 60 cents an hour to 33 cents and 40 cents. Preparations have been made for an appeal of the wage question to the War Labor Board.

Cleveland's Terminal Problem

City Considers Broad Reorganization of Its Railroad and Interurban Transportation Facilities

The submission of a new railroad freight and passenger terminal plan to the people of Cleveland, Ohio, to accommodate all roads, including interurban electrics whose traffic would thereby be removed from the public streets to private rights-of-way, has brought the city face to face with the question of abandoning the long expected Union Depot along the Lake front at the foot of the Mall or Civic Center.

STATION ON PUBLIC SQUARE

The site of the new passenger station as proposed is next to and facing on the Public Square, while the old site contemplated a monumental passenger terminal building on the sightly bluff above the lake, this building completing the architectural plan of the Mall as originally designed by Messrs. Burnham, Carrere and Brunner and later partially carried out by the Cleveland Group Plan Commission by the erection of several monumental city and county buildings and the preservation of sites for others conforming to the original Mall plan.

The new plan contemplates not only union passenger facilities but also freight houses at the high level of the business district and the co-ordination of railroad entrances under one terminal organization. Cleveland already has voted in favor of the old site. It is now contemplated to place before the voters an initiated ordinance covering the new plan.

The questions involved are so conflicting that numerous civic organizations are studying the two plans and to this end the Chamber of Commerce recently retained Bion J. Arnold, Chicago, to report upon the important features of the controversy, covering an analysis of the comparative advantages and disadvantages of the two plans, the probable result in traffic congestion on the Public Square resulting from the concentration of seven or more stations into one union station, and the practicability of largely organizing the passenger and freight carrying roads and terminal facilities in Cleveland. The most important question propounded to Mr. Arnold for solution is as follows:

THE QUESTION PUT

"Is it practicable to adjust freight and passenger terminals in this city to the future requirements of a city growing at the rate at which Cleveland is growing and still keep the union passenger station on the Mall site?"

As both the city electric railway and steam passenger traffic are growing so fast as to double in about eight years or less the problem of meeting Cleveland's rapid growth is an important one. The Cleveland district is now estimated to hold nearly 1,000,000 persons and the great industrial expansion is already developing grave problems in housing. New freight facilities are already fully absorbed; their capacity is to be more than doubled, and it is contemplated in the new plan to direct all passenger traffic through Cleveland from the lake front tracks to a new interior right-of-way which is intended to be used also by the various interurbans entering Cleveland. These electric roads handle fully one-half as many passengers as the steam roads.

The city is also studying rapid transit and subway development, new viaducts across the valley of the Cuyahoga and the straightening of this crooked stream to facilitate much-needed harbor development.

The field survey and development studies of the Arnold investigation are already in progress, in charge of J. R. Bibbins, Chicago, and a preliminary report will be shortly made public at a conference in Cleveland at which city and railroad officials and others prominently identified with this railroad question will be present.

SURVEY ALONG FAMILIAR LINES

The survey conducted by Mr. Bibbins follows identical lines of similar investigations made in connection with reports of Mr. Arnold on terminal development problems in Chicago, Baltimore, Syracuse, New Orleans and Jersey City. In these studies, the fullest co-operation and unification of railroad facilities have been urged, not only for passengers but also for freight. It remains to be seen whether such a policy as recommended by Mr. Arnold can now be adapted to the special conditions brought about by Cleveland's topography and extraordinary growth.

Praises Washington Belt Line

Washington opinion about the proposed belt line referred to in the ELECTRIC RAILWAY JOURNAL for Oct. 19, page 713, is reflected in the following comment from the *Times* of that city:

"The *Times* felicitates the War and Navy Departments on their joint decision to accept what the city of Washington knows as the 'Beeler Belt Line.'

"The *Times* also felicitates John A. Beeler for his ability to institute a common-sense plan to eliminate the terrific street car congestion in Washington.

"For the first time in the history of the national capital a nationally known street car and traffic expert has been engaged for traffic purposes only. Mr. Beeler's achievements here will be an ever-present practical proof of the theory that street car companies should employ traffic experts for traffic problems.

"The 'Beeler Belt Line' will allow 40,000 government employees to get to their offices without passing through the much congested gateway at Fifteenth Street and New York Avenue. It is answer to the traffic problem here. This newspaper is proud of the fact that it has consistently fought for and supported the 'Beeler Belt Line' idea from its inception."

Buffalo Strike Settled

A Six-Cent Fare Will Go Into Effect Pending a Decision by the Public Service Commission

The strike of the employees of the International Railway was ended on Oct. 24 when the Council adopted the plan of Justice Marcus for a settlement. The plan provides for a 6-cent fare pending the determination of the rate question by the Public Service Commission. Rebate slips will be issued to passengers entitling the holders to a return of 1 cent if the 5-cent fare is upheld. The new rate to be fixed is to continue in force only until May, 1920. The platform men are paid the wage award of the War Labor Board immediately and are to receive backwages based on this scale amounting to $300,000, if the 6-cent fare is upheld. The action of the Council is subject to another referendum. The city will name eight members of the board of directors of the International Railway and the stockholders of the company will name eight. These sixteen men are then to agree upon a seventeenth member.

Justice Marcus of the Supreme Court of Erie County had asked the Council and the company officials to agree upon a plan suggested by him. The court's plan had the approval of the railway, and has since been formally accepted by the company. Its provisions have just been recited in connection with the terms of the settlement.

Another plan under consideration which had the tentative approval of the railway and of three members of the City Council provided that the Council pass a resolution allowing the Public Service Commission to determine what was a reasonable fare and permit the company to charge 5 cents for thirty days. Other features of this plan included that the company should be operated by an executive committee of three—one man to be named by four-fifths vote of the City Council, one by a majority vote of the Public Service Commission and one selected by the company's board of directors. The fare decided upon under this plan would also have continued until May 1, 1920.

In a signed statement to the Council, President Connette had put the strike question directly up to the Mayor. He told the Mayor that the company was willing to take all chances with litigation and would abide by the decision of the Public Service Commission as to rates of fare for Buffalo if the Council would pass an emergency ordinance.

Henry W. Killeen of counsel for the company, in a public statement said: "It would be impossible for the company, no matter who owned or controlled it, to give efficient service for many weeks to come even if the present difficulties were settled immediately. More than half of the operators of cars have secured other jobs. If the Council had been willing to accept terms of settlement early in the strike before strikers got other jobs at higher wages, that might have been averted."

William A. Morgan, Buffalo, had secured an option on the properties of the railway because of the strike. Certain restrictions were attached to the option. He agreed to operate cars for a period of thirty days on a 5-cent basis with an automatic increase of 1 cent at the expiration of the thirty days with a 1-cent rebate slip to be given every passenger pending the decision of the Public Service Commission as to what would be a just fare. Mr. Morgan was said to be prompted solely by the desire to see local Buffalo interests in control of the company.

Cleveland Women Appeal

Rose Moriority, a National Figure, in Charge of Cleveland's Car Women's Interests

The women conductors of the Cleveland (Ohio) Railway working for a reversal of the decision of the Federal Department of Labor which would deprive them of their jobs on Nov. 1 have sent to Secretary of Labor Wilson a petition 446 ft. long, bearing 35,000 signatures and asking that their case be reopened. The women held their conferences, first at one carhouse and then another, to talk and plan for the overthrow of a conclusion which they believe is unjust to them and to the patrons of the road.

These women have never asked for the places occupied by men. They have sought only the vacant positions—the operation of the cars that were standing idle in the yards because there were no men to run them. The question they want answered is: Why do the men, members of the union, object to their employment in places long vacant; why do they object to women helping to win the war by filling up the gaps and operating the cars that are so badly needed by the public, and especially by the people who are working in the shops making munitions and war materials? They fail to see either justice or patriotism in such a stand.

The organization formed by the women has been christened "The Association of Women Street Railway Employees." Miss Rose Moriority, who has been conducting the fight for the women, has advised that all make application for membership in the Amalgamated Association. If this is refused, she said that a women's union will be formed. Miss Moriority was known for years as the "petticoat mayor" of Elyria, Ohio, as she held the office of assistant city clerk and took part in politics. Later she went to Cleveland where she was made assistant secretary and treasurer of the Champion Stove Company.

Boston Elevated Makes Another Statement

Public Trustees Now Find Themselves Confronted With Engineering and Labor Problems

In a public statement made by Mayor Peters of Boston on Oct. 18 the Mayor lay stress upon the serious situation confronting those responsible for the affairs of the Boston Elevated Railway and pointed out the direct interest of every taxpayer of the community in the solution of the problem before the company. It will be recalled that in passing the bill under which the company now operates the Legislature of last year very definitely provided what charges should be included in the operating expenses of the railway, and stipulated that any deficit in the revenue should be made up by taxation of the different towns served by the company. The duties of the trustees in charge of the property are of course now fixed by law.

WANTS CONSULTATION ARRANGED

In this connection Stanley R. Miller, secretary of the board of trustees for the public operation of the railway, has made a statement for the trustees. His memorandum follows substantially in full:

"It has been their aim from the outset to devise means of furnishing such reasonably good service as could be provided from the road's revenue without requiring a contribution from taxpayers in accordance with the law. War conditions may this year prevent the success of such plans. A committee made up of the kind of men which the Mayor of Boston can appoint might render invaluable assistance to the company in many ways and such help will be welcomed by the board of trustees.

"Nevertheless, one must constantly remember war conditions prevail, and have placed a heavy burden upon the company. The war's effect cannot from day to day be foreseen. Dr. Woodward, the Health Commissioner of Boston, is mistaken when he says, 'The remedy for congestion of the Boston Elevated system has been and always is in the company's own hands.' In order to increase the company's service, more power, more cars and more men are needed. No reasonable provision has been omitted by the company to secure all of them.

NEW POWER EQUIPMENT NEEDED

"The company's motive power is sufficient to operate only the surface cars now available for service. An accident last year to the company's 35,000-kw. turbine at the South Boston power station has not yet been repaired. The General Electric Company expects that it will be in operation shortly after Jan. 1, 1919, but not before because government war work has had to take precedence. A new 25,000-kw. turbine ordered from the Westinghouse Electric & Manufacturing Company for delivery in September or October, 1918, will not be installed until Feb. 1, 1919, notwithstanding the fact that the War Industries Board issued priority orders to facilitate to the utmost early delivery. Power will therefore for several months be lacking to operate additional cars and also any new cars unless they are used to replace some of the cars now in the company's service.

CAR DELIVERY DELAYED

"Nor are the new cars immediately available. The 200 new surface motor cars ordered by the trustees at their first meeting in July for delivery beginning between Oct. 15 and Nov. 15, 1918, have been delayed on account of government war work and will probably not be in service before early spring of next year. The fifty new trail cars have likewise been delayed by government war work so that they will not be in operation before next January. The remainder of the new Cambridge subway cars ordered in October, 1917, have been indefinitely delayed by government work so that there is no prospect of their delivery during the present calendar year. The same delay has occurred in much of the equipment which is needed for outfitting these same new cars upon delivery.

"The only way to facilitate the completion of turbines and equipment in less time would be for the government to consent to give the company priority over war work, which, of course, no one would want to occur.

LABOR A VITAL PROBLEM

"Labor is still a vital problem for this company. It was expected that the 28 per cent advance in wages awarded the blue uniformed employees of the company by the War Labor Board would attract a sufficient number of new employees to handle the present equipment of the company. That, however, has not proved to be the case. In spite of the widespread publicity which the company has given the attractive wage scale now paid by it under the award of Oct. 2, the net increase to date in the number of blue uniformed employees has been only sixty-eight.

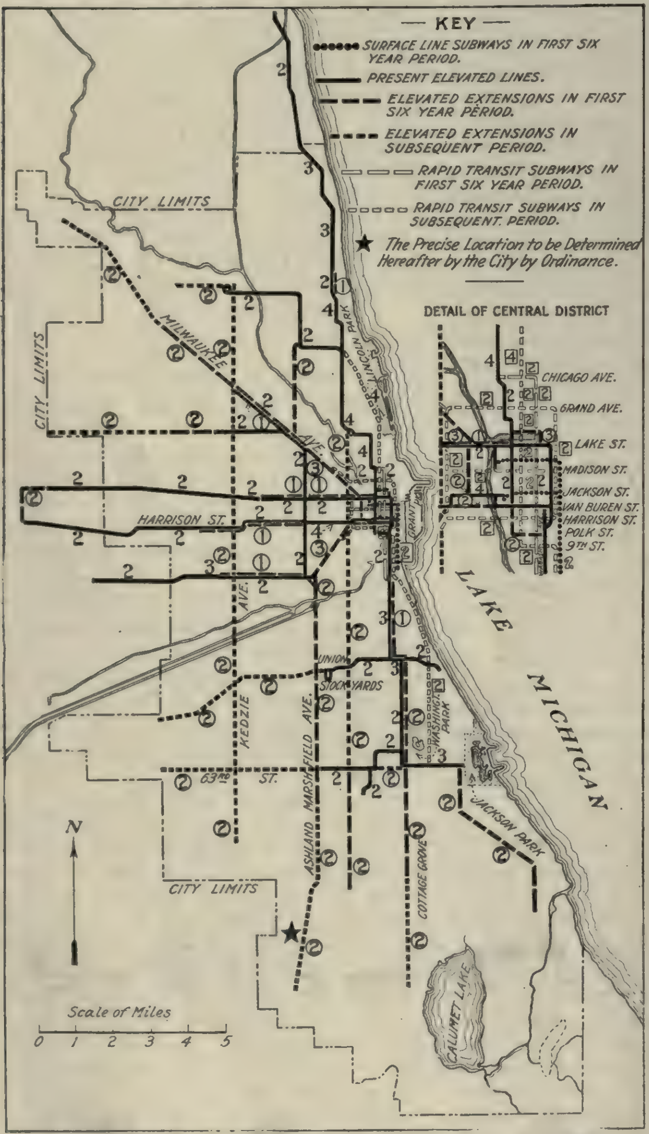
"The company has always stood ready to employ women as conductors in order that it might give the greatest possible service, but the local carmen's union has requested that the employment be postponed until the results of the increased wage scale were apparent. The trustees understand that, though the union has been loath to admit women to its membership, it now stands ready when the necessity exists to agree to the employment of women whenever they can be employed to release men for other positions. A conference at which the details incident to such an arrangement were discussed was held at the company's office on Oct. 19."

Proposed Chicago Extensions

Map Shows Scope of Work Intended to Be Done Under New Chicago Franchise

The map reproduced herewith was recently published by the citizens committee of the Chicago Association of Commerce, and placed in the mail boxes of Chicago residents. This association was one of the first of the many bodies to indorse the Chicago traction ordinance which has been discussed at length in the pages of the ELECTRIC RAILWAY JOURNAL and which comes to a public vote on Nov. 5. Since that indorsement the association has been conducting an educational publicity campaign to gain for the ordinance the support of the public.

The map shows all of the present elevated car lines, the proposed extensions during both the first six-year period and thereafter, and the proposed rapid transit and surface line subways to be built both in the first six-year period and thereafter. To simplify the map the present surface car lines have been omitted. It is stated that with the extensions indicated on this map rapid transit facilities will be furnished to 65 per cent of the people of Chicago instead of to 20 per cent as at present, and that the increase in facilities will give five rapid transit cars for each two now running.



PROPOSED RAPID TRANSIT SYSTEM IN CHICAGO

Figures show numbers of tracks as follows: Plain black, present elevated lines; black in circle, elevated extensions; black in rectangle, rapid transit subways; outline figures, surface line subways.

Asks $4,825,380 from City

A claim for $4,825,380 was presented to the city of San Francisco, Cal., on Oct. 1 by officers representing the United Railroads.

Alleged injury received by the United Railroads through the construction of the Municipal Railways and the operation of cars of the San Francisco Municipal Railway on the outer tracks on Market Street, is the basis of the claim.

In the three months when the outer tracks were being laid on Market Street by the city, the operation of the United Railroads cars was obstructed, it is alleged, by the excavations for the municipal line. Since the operation of the city cars on the outer tracks, the business of the United Railroads has been injured, it is claimed.

Before building its line the city did not make any offer to buy out the United Railroads, it is claimed. The private property of the claimant has been taken and damaged by the city without just compensation. The tracks laid on Market Street, it is pointed out, are there in violation of the charter.

By reason of the methods pursued by the city the claimant has had operating expenses increased $1,320 a month. Since July 1 the United Railroads, it is claimed, has lost $4,620. It is specified in the claim of the railroad that the demand for $4,820,380 in no respect waives any right asserted in the lawsuit against the city, which was begun on June 12, 1916, in the District Court of the United States by the United Railroads, and now on appeal to the United States Supreme Court.

A Progressive Agreement

Employees at Kansas City Make Wage Adjustment Subject to Financial Condition of Company

A feature of the wage case of the employees of the Kansas City (Mo.) Railways now before the War Labor Board for settlement is the attitude of the men toward the matter. As stated briefly in the ELECTRIC RAILWAY JOURNAL for Oct. 5, page 629, the agreement for arbitration stipulated that any advance in wages granted should be limited by the financial ability of the company. Thus the articles of agreement clearly define the limits within which the War Labor Board can decide the case. In this connection *The Railwayan*, published by the company, said in part:

"Attorneys for the company took the position that the War Labor Board had the power in ordering a wage increase to at the same time order such a rate of fare as would insure sufficient revenue to pay the wages awarded. Both joint chairmen (Taft and Walsh) pointed out to the representatives of the company and the men who were present that as arbitrators they could scarcely be expected to make a decision which would go beyond the stipulated terms of submission assented to by the company and the union."

The articles of submission are in part as follows:

"Whereas, the company claims its financial inability to meet this wage request or readjust its schedules under its present revenues and has, pursuant to a fare increase of 1 cent allowed by the Missouri Public Service Commission, granted an increase of 5 cents an hour to all employees on an hourly basis, and from 10 to 25 per cent to all employees on a monthly basis receiving $2,400 a year and under, effective in Missouri on July 16, 1918;

"Now, therefore, it is agreed by and between Division No. 764 of the Amalgamated Association and the Kansas City Railways that the matter of wages and schedules shall be placed before the National War Labor Board for adjustment subject to the general financial condition of said company and its financial ability under present revenues or any future increases allowed pursuant to action or recommendation of the War Labor Board or otherwise to pay any wage increase which may be granted."

In commenting on the agreement *The Railwayan* said:

"In signing the articles of submission in the above form, the representatives of the union whose names appear above have taken a position in advance of that taken by any other local of the Amalgamated in the United States. They have shown that they do not expect a wage increase which is not justified by the financial condition of the company, nor do they request an impossibility, which would be the result had they demanded increased wages regardless of the company's income."

Staggered Hours in Denver

The Board of Health of Denver, Col., has adopted rules for opening and closing business houses in that city and fixing limits to the number of passengers to be allowed to ride at one time on a car of the Denver Tramway. These rules follow:

1. All retail stores in the business district open at 9 a. m.; close at 6 to 6.15 p. m.
2. All offices open at 8 to 8.30 a. m. or earlier; close at 4.30 to 5 p. m.
3. Only sixty-five passengers are allowed on a car at one time.

Increased Wages for Winnipeg

The report of the Board of Conciliation appointed to investigate the dispute between the Winnipeg (Man.) Electric Railway and its motormen and conductors was handed out at Ottawa on Oct. 15 by the Minister of Labor. It recommends an increase of 9 cents an hour in the wages paid during the first and second six months of employment, an increase of 11 cents an hour in the wages paid during the second year, and an increase of 12 cents an hour in the third year. The latter increase, which brings the rate up to 47 cents an hour, it is proposed to apply to the fourth and subsequent years of employment. The new scale, which is recommended by the board to go into effect from the first day of the present month, is as follows:

For the first six months, 39 cents an hour; for the second six months, 41 cents an hour; for the second year, 44 cents an hour; for the third and succeeding years of continuous service in the employ of the company, 47 cents an hour.

The board also recommends that the request of the men that they shall receive time and a half for overtime be granted. The decision was unanimous.

In order that the increased wages recommended may be paid, it is necessary, states the report, that the company should obtain an increased revenue. In this connection the board says:

"It appears by the evidence before us that the company has paid no dividend to its shareholderse since December, 1915, and at the present time, notwithstanding the elimination of the jitney competition, the operating expenses and fixed charges of the railway exceed by several thousand dollars per month the railway's actual earnings, and that there is no source of revenue from which increased wages can be paid. The Winnipeg Electric Railway's financial situation is not different from that of a great many other railways in the United States and Canada, and in justice to the company the public should pay an adequate war compensation for a service which cannot be rendered except for war prices."

It was reported from Winnipeg on Oct. 22 that the railway had notified the Dominion Government that it could not meet the wage award unless the city officials permit the company to increase its fare to 6 cents.

News Notes

Wage Increase in Springfield, Ill.—Trainmen of the Springfield (Ill.) Consolidated Railway have received an increase in wages. Men entering the service of the company will receive 32 cents, while others will receive 33 cents and 36 cents an hour. The increase amounts to a 3-cent flat raise and is the third increase granted by the company this year.

Patriotism Rewarded With Bonds.—The platform men in the employ of the Trenton, Bristol & Philadelphia Traction Company, Philadelphia, Pa., were called together recently at a dinner by the corporation and $1,600 in Liberty Bonds were distributed. The men obligated themselves a year ago to pay for the bonds, and as a mark of gratitude the railway duplicated as many bonds as the men had paid for.

Bad Faith Charged.—The Public Service Commission for the First District of New York has directed its counsel to begin mandamus proceedings against the Brooklyn Rapid Transit Company to compel it to obey the former orders of the commission to put on about 100 more cars. In a long opinion, upon which the action of the commission was based, Commissioner Travis H. Whitney accuses the company of bad faith in the dilatory tactics to obey the order to put on more cars.

Franchise Negotiations in Vancouver.—The British Columbia Electric Railway has presented to the City Council of Vancouver, B. C., proposals regarding the renewal of its franchise. The company demands a continuance of the 6-cent fare, with half fares for children, and promises an announcement of a reduction in lighting rates to be made coincident with the citizens voting on the new franchise by-law. The City Council and the officials of the company will shortly start joint negotiations.

$300,000 for Engineering Research.—Ambrose Swasey, Cleveland, Ohio, has just given the Engineering Foundation an additional $100,000 for endowment of engineering research. In 1915 he gave $200,000 for this purpose, so that his total gifts are now $300,000. Mr. Swasey's original gift made possible the establishment of the Engineering Foundation, representing the American Society of Civil Engineers, American Institute of Mining Engineers; American Society of Mechanical Engineers and American Institute of Electrical Engineers.

Mr. Duffy Leaves Manila Company.—C. Nesbitt Duffy has resigned as vice-president of the Manila Electric Railroad & Light Company, Manila, P. I., to accept the position of vice-president of the Visayan Refining Company, Manila, P. I. one of the largest cocoanut oil companies in the Philippine Islands. Mr. Duffy is to take over his new duties on Nov. 1. J. C. Rockwell, the present general manager of the Manila Electric Railroad & Light Company, is being placed in full charge of the affairs of that company in Manila by The J. G. White Management Corporation, New York, N. Y., the operating managers of the property.

San Diego Increases Wages.—The San Diego (Cal.) Electric Railway Company, through Vice-President and Managing Director William Clayton, announced on Oct. 7 that the new scale of wages for platform men would go into effect immediately, with back pay from Sept. 1. This new scale means 40 cents an hour for the first-year men and 45 cents an hour for the second-year platform men and older employees. Increases also will be given employees of the mechanical departments. This action was taken by the company in what it regards as its own best interests although the appeal of the company to the Railroad Commission for increased rates has not yet been passed upon.

Survey Parties Needed by Army.—The construction division of the army is without doubt the most colossal organization of its kind in the history of the world. The approximate value of construction projects so far undertaken by this branch of the government is $1,000,000,000. Its present urgent needs include fifty chiefs of survey party at $2,700 to $3,000 a year; fifty transitmen at $2,400 a year; twenty-five levelmen at $2,100 a year; 125 rodmen at $1,800 a year; 150 chainmen at $1,800 a year, and fifty topographic draftsmen at $2,100 a year. These positions are in the civil, not the military, service. Persons interested should apply to the United States Civil Service Commission, Washington, or to the secretary of the local board of civil service examiners in many of the large cities.

Wage Increase in Indianapolis.—The Indianapolis Traction & Terminal Company, Indianapolis, Ind., has increased the wages of conductors and motormen following the order of the Public Service Commission that a straight 5-cent fare be granted on condition that wages of the employees be advanced at least 50 per cent over the scale paid prior to the general increase of about July 1, 1918. Conductors and motormen who have been in the service of the company one year or less will receive 34 cents an hour; more than two years and less than three years, 36 cents an hour; more than three years and less than four years, 37 cents an hour; more than four years and less than five years, 38 cents an hour; five years and over in service, 39 cents an hour. The scale since July has been from 25 cents to 33 cents an hour. Before July 1 new men received 22 cents an hour.

Financial and Corporate

B. R. T. Net Drops

Owing to Higher Operating Costs, Taxes and Interest, Net Income Declines 20 Per Cent

The net operating revenue of the Brooklyn (N. Y.) Rapid Transit Company for the year ended June 30, 1918, showed a decrease of $367,909 or 2.88 per cent. As in almost all similar cases, this falling off was due to the burden of operating expenses. Although the gross operating revenues gained $1,002,478 or 3.40 per cent, the operating expenses advanced further to the extent of $1,370,387 or 8.19 per cent.

POWER PLANT COSTS UP TO 30.67 PER CENT

The largest item of increased expense, both in amount and in percentage, was power-plant operation. The expenditures for this increased $626,192 or 30.67 per cent. Other increases were as follows: Maintenance of equipment, $136,534 or 5.47 per cent; operation of cars — trainmen's wages, $174,574 or 3.11 per cent; operation of cars—other expenses, $286,351 or 14.48 per cent; and damages, $159,176 or 22.30 per cent. Maintenance of way and structures showed a decrease of $24,849 or 0.99 per cent.

Owing to a decline of $20,085 or 4.69 per cent in other income and a rise of $92,548 or 3.94 per cent in taxes and of $602,640 or 10.68 per cent in interest and rentals, the net income for the last year fell off $1,083,184 or 20.85 per cent. After appropriations of $935,761 for supercession and depreciation, as compared to $289,022 in 1916-1917, and of $2,233,659 for dividends as compared to $4,467,318, and other adjustments, there remained on June 30, 1918, a surplus of $12,812,581, an increase of $845,308 over that of a year before.

According to the company's report, the results of operation of rapid transit lines under contract with the city continue to be satisfactory, considering that only a portion of the Broadway subway has been completed. For the fiscal year the passenger revenue from the rapid transit lines increased $1,584,970; operating expenses, maintenance, depreciation, taxes and rentals increased $1,284,124, and net revenue (applicable to interest on new investment) increased $401,999.

Since the beginning of the pooling arrangement with the city on Aug. 4, 1913, the operating company has earned in full its first preferential of $3,500,000 per annum, and $2,104,296 toward its second preferential, leaving $1,443,028 to be made up out of future earnings. The interest to date paid by the city on its cost of construction of property placed in operation plus a sinking fund at the rate of 1 per cent per annum totals $4,985,850, making the total deficit $6,428,882. The deficit in the company's preferentials is to be made good from future net income before payment of the city's interest and sinking fund charges. The deficit in the city charges during temporary operation is to be added to the cost of construction of city owned lines, but after "initial" operation it is chargeable to the tax budget.

SURFACE EARNINGS FALL OFF

The passenger earnings on the surface lines fell off $565,851 or 3.3 per cent during the year. While part of this increase may be attributed to the competition of new rapid transit lines, it is said that any influence in this direction should have been overcome by the normal increase in traffic. The principal cause of diminishing revenue was the inability, on account of the shortage of men, to operate the full complement of cars.

COMPARATIVE INCOME STATEMENT OF BROOKLYN RAPID TRANSIT COMPANY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Transportation revenue	$29,879,309	97.94	$28,992,111	98.27
Miscellaneous revenue	627,188	2.06	511 908	1.73
Total operating revenues	$30,506,497	100.00	$29,504,019	100.00
Maintenance of way and structure	$2,480,439	8.13	$2,505,288	8.50
Maintenance of equipment	2,632,885	8.63	2,496,349	8.46
Operation of power plant	2,667,809	8.74	2,041,617	6.92
Operation of cars—trainmen's wages	5,780 108	18.95	5,605,533	19.00
Operation of cars—other expenses	2,264,439	7.42	1,978,089	6.70
Damages	872,945	2.86	713,768	2.42
Legal expenses in connection with damages	258,111	0.85	269,523	0.91
General law expenses	63,658	0.21	57,394	0.20
Other general expenses	811,023	2.66	768,991	2.60
Freight expenses	280,099	0.92	304,666	1.03
American Railway Traffic Company—expenses	288	0.00	199	0.00
Total expenses	$18,111,805	59.37	$16,741,417	56.74
Net revenue from operation	$12,394,692	40.63	$12,762,602	43.26
Income from other sources	407,729	1.34	427,814	1.45
Gross income	$12,802,421	41.97	$13,190,416	44.71
Taxes	$2,443,652	8.01	$2,351,104	7.97
Interest and rentals (net)	6,246,715	20.48	$5,644,074	19.13
Total deductions	$8,690,367	28.49	$7,995,178	27.10
Net income	$4,112,054	13.48	$5,195,238	17.61

The net capital expenditures for additions and improvements aggregated for the fiscal year $8,669,393, of which $8,518,566 was expended by the New York Municipal Railway Corporation on rapid transit lines pursuant to the provisions of its contract with the city. The total of such expenditures to June 30, 1918, is $58,499,877, divided, subject to redistribution as to certain classifications, as follows: On account of contribution to city owned lines, $11,160,501; on account of equipment of city owned lines, $11,245,213, and on account of additions, extensions and improvements of existing railways, $36,094,162. Less than half of this expenditure represented property in operation during the year.

RESERVE ACCOUNTS INCREASED

The reserve accounts were increased during the year as follows: Fire insurance, $62,581; amortization of capital, etc., $786,293, and employer's liability, $55,952—total $904,827. As against these increases the following charges were made: Retired property adjustments, etc., $120,549, and payments on account of employer's liability, $16,320 for the year, leaving a net increase in reserves of $767,956 for the year.

Miscellaneous operating statistics for the last two years follow:

	1918	1917
Passenger earnings	$29,492,279	$28,485,861
Increase (per cent)	3.53	5.26
Passengers carried	771,044,274	760,519,397
Revenue mileage	97,333,571	98,593,632
Decrease (per cent)	1.28	0.16
Earnings per revenue-mile (cents)	30.3	28.8
Units per passenger (cents):		
Passenger earnings	3.82	3.74
Miscellaneous earnings	0.19	0.19
Total earnings	4.01	3.93
Operating expenses	2.35	2.20
Taxes	0.32	0.31
Interest and rentals	0.81	0.74
Total	3.48	3.25
Surplus	0.53	0.68

International Railway Deposits Asked

Holders of a large amount of the International Traction Company's 4 per cent bonds on Oct. 18 appointed the following committee to act for the protection of all the holders of these bonds: T. De Witt Cuyler, Philadelphia; Elliott C. McDougal, president of the Bank of Buffalo, Buffalo, and T. E. Mitten, president of the Philadelphia Rapid Transit Company.

This action, a statement by the committee said, was due to difficulties that resulted in a suspension of operation and threatened default in the payment of interest due on Nov. 1, together with the imminence of a receivership. The protective agreement is being prepared which will call for deposits of the bonds under the terms that will be set forth in the agreement.

Capital Traction Prospers

Abnormal Conditions in Washington Lead to 21 Per Cent Gain in Receipts from all Sources

The operating revenues and the non-operating income of the Capital Traction Company, Washington, D. C., increased $501,621 or 21.4 per cent during 1917. This sum was absorbed as follows: Additional expenses for labor and materials, $191,964; increase in depreciation allowance, $102,954; tax increase, $43,469, and extra dividends to stockholders, $150,000. In addition $46,531 was carried forward to surplus as the result of the year's operation.

INCOME STATEMENT OF CAPITAL TRACTION COMPANY FOR CALENDAR YEAR 1917

Operating revenue	$2,783,538
Operating expenses	1,533,329
Net operating revenue	$1,250,209
Taxes	186,283
Operating income	$1,063,926
Non-operating income	16,262
Gross income	$1,080,188
Deductions	283,658
Net income	$796,530
Dividends	750,000
Surplus for year	$46,530

The increase in earnings was due to the abnormal conditions in Washington. While the greatly augmented receipts enabled the company to meet the increases noted above, conditions give no assurance, it is said, that the company will be able to make such a satisfactory showing in the future. On some of the lines the ultimate capacity has been reached, and any considerable growth in revenue would have to be accompanied by further capital expenditures and correspondingly increased fixed charges. Moreover, the larger part of the 1917 net earnings was accumulated during the early part of the year, before the full effect of rising operating costs was felt.

Taxes Up 30.4 per Cent

The taxes for 1917 were larger by $43,469 or 30.4 per cent than those in the preceding year. The major part of the increase was caused by the federal income tax and the capital stock tax.

In 1917 the appropriation for depreciation was materially increased to $225,833, based on actual values of the property and rates of depreciation recommended by the Public Utilities Commission. Expenditures from the depreciation fund during the year, chiefly for track renewals, amounted to $84,093, leaving the balance on Dec. 31, 1917, $328,941. Of this amount $180,000 has been invested in Liberty Bonds.

The number of revenue passengers carried in 1917 was 64,285,993 as compared to 53,482,546 in 1916, while the transfer passengers totaled 19,412,983 and 16,487,820 respectively. The car-miles increased from 7,769,389 in 1916 to 7,871,530 in 1917. The net capital expenditures for 1917 were $127,511.

The following table gives car-mile and passenger financial statistics for the last two years:

	Cents Per Car Mile		Cents Per Passenger	
	1917	1916	1917	1916
Passenger revenue	35.15	29.26	3.30	3.24
Other revenue	0.42	0.32	0.04	0.04
Gross revenue	35.57	29.58	3.34	3.28
Operating expenses	19.48	15.93	1.83	1.77
Taxes	2.37	1.84	0.22	0.20
Interest	3.60	3.63	0.34	0.40
Net income	10.12	8.18	0.95	0.91

City Intervenes in Receivership

Judge Charles P. Orr in the United States District Court at Pittsburgh on Oct. 19 handed down an opinion and order granting the petition of the city of Pittsburgh to intervene as a party plaintiff in the receivership proceedings against the Pittsburgh Railways, placed in the hands of receivers several months ago. The petition of the city was presented by Special City Solicitor C. K. Robinson on July 20 and a supplemental petition was filed on Sept. 27. In his order Judge Orr granted permission to the city to intervene in its own behalf and in the behalf of the surrounding boroughs, cities and townships through which the Pittsburgh Railways now operates. The court said in part:

"Without now passing upon the merits of any of the matters presented in the petition except upon the question of intervention, this court has reached the conclusion that the petition of the city, in so far as it prays to intervene in its own behalf and in behalf of others, should be granted.

"Intervention is not allowed because the petitioner is a creditor or because it claims to be guardian of public interests or because it will be afforded better opportunities to assert the duty of the receivers to comply with its demands. The rights of the creditors are protected in the distribution of funds. The general public interests are well guarded by the courts and the controversies between municipalities and the receivers can be separately adjusted.

"The municipality is in the nature of one who has a substantial interest in property used by a street railway. One who has a substantial interest in property placed in the hands of receivers appointed in litigation is almost invariably permitted to intervene for the protection of the property. There is no reason why the city of Pittsburgh, on its own behalf and as representing the class, should not be permitted to intervene in the like manner.

"The intervention by the city of Pittsburgh will not tend to increase the labors of the receivers or lead to confusion, but will rather simplify some of the perplexities which are bound to arise in this receivership. Being a party to the proceedings, the city of Pittsburgh subjects itself to the jurisdiction and to the proper orders of this court."

Would Abandon Service

Spokane Company Saw in This the One Quick Way Out of Its Difficulties

Early in October the City Council of Spokane, Wash., ordered the Washington Water Power Company to resume railway service on certain of its lines which the company had abandoned on the plea that operation did not pay. In its letter ordering service resumed, the city contends that the giving of service on these lines is a franchise obligation and can be set aside only by agreement between the city and the company. The city was not consulted when the service was discontinued by the company.

Without stating what would eventually be done in regard to the city's mandate, the company asked to be allowed to continue not to operate the lines until the hearing on Oct. 23 before the State Public Service Commission when other railway matters are to be considered, and lay the situation before that body. This request is being considered by the counsel for the city, and it seems likely that the matter will remain in status quo until after the public hearing.

The city authorities assert that the Public Service Commission has no jurisdiction over franchise provisions, and that the requirement to maintain service over certain lines is entirely within the jurisdiction of the municipality. They say that the company can be compelled to maintain service on all lines covered by the franchise unless the city authorities see fit to release the company from its franchise obligations.

D. L. Huntington, president of the company, said recently:

"Unless we are allowed to cut down expenses, we will be forced to ask the Legislature to amend the statute limiting the fare. The situation for the railway is critical. On one side is the statutory limit of the 5-cent fare. On the other side is increased taxation, increased wages for employees and increased costs for everything that goes into the railway. We have to get more money through increased fares or cut expenses through curtailed service."

Salt Lake Traffic Still Dwindling

In the Electric Railway Journal for Sept. 21, page 523, facts taken from company sources were reproduced showing the falling off in passenger traffic on the lines of the Utah Light & Traction Company, Salt Lake City, Utah. According to *Kar-Fax* for Oct. 12, issued by the company, traffic continues to dwindle. In the issue just mentioned that paper says:

"There were just 455,300 fewer passengers on the Salt Lake street cars during September this year than during the same month last year.

"Now, even though approximately 40 per cent of the patrons paid 6-cent fares, as compared with a 5-cent fare last year, you can see that the loss to the company was an enormous sum.

"This loss in traffic has been going on so long that measures have had to be adopted to offset the loss in revenue caused by it. The skip stop, though not primarily adopted for that reason, will help some, and a reduction in service on some lines during the slack hours is to be tried as a further remedy."

Fixed Charges Ordered Paid

Following the filing of a petition by J. D. Callery and H. S. A. Stewart, two of the three receivers of the Pittsburgh (Pa.) Railways, setting forth a statement of the indebtedness of the Pittsburgh Railways falling due during the month of October and aggregating $530,128, Judge Charles P. Orr, in the United State District Court, on Oct. 17 ordered the receivers to pay out moneys in the way of interest and fixed charges aggregating $100,152.

The same day Judge Orr also handed down three additional orders directing the receivers to pay to the Fidelity Title & Trust Company $87,500 for interest due on mortgages to the Pittsburgh, Allegheny & Manchester Traction Company, the Federal Street & Pleasant Valley Passenger Railways Company and its subsidiary companies, and to the Pittsburgh Traction Company. These orders were made subject to the terms and limitations of the court's opinion of Sept. 7, disposing of the petition of the Consolidated Traction Company.

In the petition of the railways company filed on Oct. 17 Receiver Charles A. Fagan's name did not appear. Recently Mr. Fagan filed a supplemental petition in the United States District Court in which he set forth his objections to the payment of fixed charges in view of the recent increase in the employees' wage scale and the uncertainty of the 7-cent fare. Mr. Fagan's dissent was noted at length in the ELECTRIC RAILWAY JOURNAL for Oct. 19, page 714.

Financial News Notes

New Pacific Gas & Electric Director.—Nion R. Tucker has been elected a director of the Pacific Gas & Electric Company, San Francisco, Cal., to take the place of Capt. Norman B. Livermore, resigned.

Montreal Dividend Passed.—The Montreal (Que.) Tramways, which deferred its dividends of 2 per cent for the quarter ended June 30 last, has further deferred it for the quarter ended Sept. 30.

Deferred Interest Paid.—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., announced on Oct. 15 that the interest coupon on the first and refunding mortgage 5 per cent forty year gold bonds which was due and payable on July 1, would be paid on and after Oct. 15, together with compound interest from July 1 to Oct. 15.

Object to Removal of Line.—The people of Medford and Jacksonville plan to fight the proposal of S. S. Bullis, president Southern Oregon Traction Company, to dismantle the line and dispose of the rails to the government. Injunction proceedings are being planned. Protest resolutions of the two City Councils recite that both cities contributed substantially to the building of the road, and that its removal now would be a serious blow.

Colorado Springs Protective Committee.—In view of default of the coupon maturing on Oct. 1 last, holders of first consolidated 5 per cent bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., due in 1942, are requested to communicate with a committee designated to act for the protection of the bondholders' interests. The committee is composed of Mortimer N. Buckner, president of the New York Trust Company, New York, and Frederick J. Lisman, F. J. Lisman & Company, New York.

New Indianapolis Directors.—Alfred C. Potts has been appointed a public director of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., by Governor James P. Goodrich of Indiana. B. A. Worthington has been appointed to a similar position with the company by the Chamber of Commerce of Indianapolis. A third appointment will be made by the Mayor of the city of Indianapolis. These appointments are in keeping with an order of the Indiana Public Service Commission in the fare case, to which the Indianapolis Traction & Terminal Company agreed, that three public directors be appointed who shall serve to Jan. 1, 1919. Thereafter public directors are to serve for a term of one year. The order directs that the board shall report to the commission within sixty days and thereafter every ninety days. The duty of the public directors, in the language of the order is "to serve faithfully the interests they represent, but always with absolute fairness and equity to the company, and to strive to attain better service and secure and maintain hereafter, so far as possible, a frank, honest and open policy on the part of the company toward the city of Indianapolis and the people thereof." W. Kesley Schoepf, Cincinnati, Ohio, has resigned as a director of the company. This resignation will leave four directors, J. W. Willy, John J. Appel, Ferdinand Winter and Robert I. Todd, who with the two appointees named above and one more to be nominated, will make up the directorate. The number of directors has been increased from five to seven.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '18	$82,666	*$49,054	$33,612	$20,354	$13,258
1m., Aug., '17	78,486	*43,521	34,965	19,227	15,738
12m., Aug., '18	921,663	*552,537	369,126	236,220	132,906
12m., Aug., '17	865,266	*492,238	373,028	223,977	149,051
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Aug., '18	$164,063	*$121,136	$42,927	$32,079	$10,848
1m., Aug., '17	142,801	*101,878	40,923	29,871	11,052
12m., Aug., '18	1,577,686	*1,399,288	178,398	371,764	†193,366
12m., Aug., '17	1,379,817	*966,918	412,899	357,054	55,845
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., Aug., '18	$343,770	*$255,323	$88,447	$59,245	$29,202
1m., Aug., '17	333,849	*233,627	100,222	50,761	49,461
12m., Aug., '18	4,240,145	*3,085,212	1,154,933	632,821	522,112
12m., Aug., '17	3,824,984	*2,598,042	1,226,942	543,857	683,085
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Aug., '18	$1,862,921	*$1,273,246	$589,675	$506,306	$83,369
1m., Aug., '17	1,585,919	*1,022,683	563,236	437,829	125,407
12m., Aug., '18	21,269,646	*14,233,848	7,035,798	5,778,119	1,257,679
12m., Aug., '17	18,582,072	*11,031,354	7,550,718	5,156,724	2,393,994

EAST ST. LOUIS & SUBURBAN SYSTEM, EAST ST. LOUIS, ILL.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '18	$372,462	*$303,987	$68,475	$67,380	$1,095
1m., Aug., '17	317,838	*214,640	103,198	65,175	38,023
12m., Aug., '18	3,981,837	*2,952,176	1,029,661	806,511	223,150
12m., Aug., '17	3,484,103	*2,237,784	1,246,319	771,280	475,039
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., June, '18	$3,289,610	*$1,958,897	$1,330,713	$1,190,608	‡§$377,022
1m., June, '17	3,257,237	*1,683,460	1,573,777	1,041,775	‡§633,203
12m., June, '18	40,497,728	*22,871,920	17,625,808	13,556,649	‡§7,171,267
12m., June, '17	39,866,146	*19,454,678	20,411,468	12,085,186	‡§9,102,654
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., July, '18	$3,227,989	*$2,080,511	$1,147,478	$1,361,774	‡§$288,031
1m., July, '17	2,911,301	*1,693,134	1,218,167	1,064,983	‡§451,788
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.					
1m., Aug., '18	$336,524	*$205,004	$131,520	$71,423	$60,097
1m., Aug., '17	324,901	*181,164	143,737	70,302	73,435
12m., Aug., '18	3,158,011	*2,193,621	964,390	852,272	112,118
12m., Aug., '17	3,038,213	*1,997,428	1,040,785	813,884	226,901
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1m., Aug., '18	$671,067	*††$452,586	$218,481	$190,284	$28,197
1m., Aug., '17	505,552	*303,922	201,630	178,505	23,125
12m., Aug., '18	7,131,359	*††4,466,857	2,664,502	2,180,793	483,709
12m., Aug., '17	5,785,649	*3,142,497	2,643,152	2,166,386	476,766

* Includes taxes. † Deficit. †† For the month $20,132, and for twelve months, $330,425, included for depreciation.

‡ Includes non-operating income.

§ Includes accurals under rapid transit contracts with city payable from future earnings.

Traffic and Transportation

39,000,000 More Passengers

Year Ended June 30 Shows This Increase on the Rapid Transit Lines in New York City

According to reports just tabulated and made public by the Public Service Commission for the First District of New York, the rapid transit lines of the city of New York (underground and elevated roads) carried a total of 1,024,615,280 passengers for the year ended June 30, 1918. This is an increase of about 39,000,000 over the preceding year. Divided among the different systems, the ticket sales were as follows:

Division of Ticket Sales

On city subways operated by the Interborough Rapid Transit Company, 418,337,666.

On the company-owned elevated lines operated by the Interborough Rapid Transit Company, 352,660,669.

On the city subways operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit System) 104,669,567.

On company-owned elevated lines operated by the New York Consolidated Railroad 150,388,060.

The increase for the year was below normal and was due mainly to the new subway lines of each system. For instance, the old subway, operated by the Interborough Rapid Transit Company, showed a decrease of 11,226,476 passengers, while the new subways (Queens Borough subway, White Plains road, Seventh Avenue and Lexington Avenue lines), showed an increase of 15,002,257, making the net increase for the year 4,143,674.

Elevated Traffic Increases

The traffic on the elevated railroads in Manhattan and the Bronx operated by the Interborough Rapid Transit Company showed a net increase for the year of 3,200,576, which is comparatively small, and was due to a falling off in ticket sales at some stations on all lines. The Third Avenue line as a whole showed a decrease of more than 2,500,000 for the year, while the Second Avenue showed an increase of more than 5,000,000. The Sixth and Ninth Avenue lines showed increases of about 135,000 and 585,000 respectively.

On the New York Consolidated system the company-owned lines showed an increase of 6,724,300, while the city-owned lines scored an increase of 24,856,772.

Among the largest ticket sales by stations on the subway lines operated by the Interborough are the Grand Central Station, with a total of 26,100,215; Atlantic Avenue, Brooklyn, with 21,516,847; Brooklyn Bridge station, with 21,222,947; Fulton Street station, with 18,279,325, and Fourteenth Street station, with 16,108,367.

On the elevated lines operated by the Interborough Rapid Transit Company some of the heaviest stations were: City Hall on the Third Avenue line, with 9,342,520 ticket sales; 106th Street, Third Avenue line, with 7,027,269; Thirty-third Street on the Sixth Avenue line, with 7,375,132.

Points of Heavy Traffic

On the New York Consolidated system some of the heaviest stations were Chambers Street on the Broadway-Fourth Avenue subway, with 23,239,201 ticket sales which, by the way, was a decrease of more than 4,600,000 from the preceding year; Brooklyn Bridge (Park Row), on the elevated lines, with 18,157,610, which is also a decrease of nearly 1,000,000.

Citizens Favor Increase

Citizens of Shawnee, Okla., are preparing a petition to be presented to the Corporation Commission of Oklahoma asking that body to issue an order permitting the Shawnee-Tecumseh Traction Company to increase its fares from 5 cents to 7 cents. This action was initiated by the members of the Rotary and the Lions Clubs and has been indorsed by the members of the Shawnee City Council and by civic and commercial organizations. R. D. Long, general manager of the Shawnee-Tecumseh Traction Company, is said not to have known what was being done until announcement of the plans was made at a banquet arranged recently by the Rotary and the Lions Clubs "for a discussion of traction problems," and at which Mr. Long was guest of honor.

In speaking of this banquet, Mr. Long said:

"As an electric railway manager, I was prepared to listen to protests and complaints, and I went to Shawnee expecting to be told that somebody had fault to find with the manner in which the company was being operated. As a matter of fact, the company had lost $130,000 in the last ten years through the Shawnee property. So when I was asked to talk about the company at the conclusion of the luncheon, I told of the handicaps under which we were operating, but did not hint at any increase in the rate of fare.

"Then the clubs went on record as favoring a schedule that would provide for a 7-cent fare or for the sale of sixteen tickets for $1. The petition is being prepared by these clubs and by other citizens of Shawnee. I have taken no part in the movement to bring about the increase."

New Rhode Island Fares

Modification of Former Zone System Went Into Effect on Oct. 23—Permanent Solution Demanded

Increased fare schedules on the system of the Rhode Island Company, Providence, R. I., went into effect on Oct. 23 in accordance with a decision of the Public Utilities Commission handed down on Oct. 19.

The new schedules are calculated by the company to produce an increase in the annual revenue amounting to $1,900,000, and the company believes that it will be able to meet its operating expenses, wage increases, and rentals, under the new order. It did not ask for fare increases sufficient to pay depreciation charges or any dividend upon its stock.

The new fare schedule is based upon the 5-cent unit fare, on a zone system. Starting from the center of Providence, on the suburban lines, and on lines running beyond the first zone limit, the passenger pays an initial fare of 5 cents which takes him generally 2 miles. He can then ride 1¾ miles for another nickel, and after that pays 5 cents for every 1½ miles. One cent is charged for every transfer issued, at any place on the entire system.

In granting permission to put the schedule into effect, the commission ordered slight modification in the zone terminals, to remove local unfairness. It notified the company that the new fares would hold for four months, and that each month a detailed report must be filed showing the exact result of the company's receipts and expenses.

As soon as the fare increase was made authoritative the company notified its employees that the new wage scale would become effective immediately.

On the evening of Oct. 19 the carmen's union held a meeting, received the formal notice of the wage increase being granted, and voted unanimously to accept conditions.

The substantial interests in the State are already preparing to go before the General Assembly when it meets in January and seek legislation providing a permanent solution of the electric railway problem.

Columbus Retains Expert

The Columbus Railway, Power & Light Company, Columbus, Ohio, has engaged the services of W. J. Bieneman, president of the State Public Service Utility Audit Company, Charleston, W. Va., to look after its interest in the application for increased fares now pending before the City Council of Columbus, Ohio. Mr. Bieneman has for several years past made rate cases for public utilities a specialty and has been very successful in representing public utilities before state and federal commissions. It is acknowledged by several state commissions that a feature of Mr. Bieneman's exhibits is the clearness and fairness with which these are prepared.

P. S. Seven-Cent Fare Approved

League of Municipalties Loses First Legal Step to Block Justice to New Jersey Lines

The recent action of the Board of Public Utility Commissioners of New Jersey in authorizing a 7-cent fare for the Public Service Railway in addition to a 1-cent transfer charge was affirmed by Supreme Court Justice Swayze on Oct. 18 in *certiorari* proceedings. Under a joint stipulation previously filed the decision of Justice Swayze is accepted as the judgment of the court, and the case will now go on appeal before the November term of the Court of Errors and Appeals, the highest court in the State.

ARGUMENT OF OPPOSITION

According to Justice Swayze the chief point made by counsel for the League of Municipalities, which has been trying to block fare relief for the company, is that the commission had no jurisdiction to grant the increase since it was without evidence of property value. In refusing agreement on this point, the justice pointed out that under one section of the regulatory law the commission must approve a company-initiated increase when it is satisfied that the increase is just and reasonable.

According to the evidence, the increase approved was only enough to enable the company to meet the increased expenses forced upon it by the awards of the War Labor Board. The complainants did not venture to introduce evidence or to contradict the railway evidence, but simply assumed that the justice and reasonableness of a rate can be determined only by first ascertaining the property value.

REASONABLENESS OF RATE A BUSINESS MATTER

In Justice Swayze's opinion, however, the reasonableness of a rate is a business question, depending upon many factors. It is the result of "a composition of forces." In amplifying this point the justice said:

> There can be no better evidence of the reasonableness of a rate than its general adoption by the municipalities of this and other states in ordinances granting consent to the location of street railways, over a long succession of years, with acquiescence by the public without question, and, as far as we know, without complaint either by the public or by Boards of Public Utility Commissioners.
>
> Five cents was certainly not on its face unreasonably high, since it was a standard rate, and there was an entire absence of proof on the part of the prosecutor. It follows with the certainty of a geometrical axiom that the addition of just enough to meet the increased wages forced on the railway by the War Labor Board could not make unreasonably high what was not so before.
>
> The failure to allow any return on capital investment would, if this had been a case of the board fixing a rate, instead of its approving a rate fixed by the railway, have been a violation of the principle of the gas rate case that a just and reasonable rate must be sufficient to induce the investment of capital in the business and its continuance therein.

From the uncontradicted evidence put in by the company, Justice Swayze said, he was unable to see how the commission could have drawn any other conclusion than the one which it reached. If any doubt existed, he believed it would be removed by the suggestion of city counsel as to the method by which the railway might meet the increased expense for wages.

One counsel suggested that the difficulty might be overcome by decreasing the service rendered, while another "with seeming seriousness and indifference to results" suggested that relief could be found in the appointment of a receiver. Justice Swayze disposed of the former suggestion with the observation that the commission as a matter of business policy had preferred to keep up the service even at the cost of increasing the rate and that no one except city counsel now suggests that a reduction of efficiency would be tolerable or tolerated.

POWER TO REGULATE, NOT TO DESTROY

As for a receivership the justice stated:

> I do not say that if a reasonable rate drove the operating companies into insolvency, that rate could not be established against the underlying companies. I only say that the present proceeding is not adapted for that purpose. The act contemplates a regulation of still existing public utilities for the benefit of the public, not their destruction. It was decided more than thirty years ago that the constitutional power was a power to regulate, not a power to destroy.

The municipal counsel had again raised the question of the power of the New Jersey commission to set aside the fare limits set in municipal franchises, but Justice Swayze succinctly disposed of this point with the observation that the matter, as far as the Supreme Court is concerned, was disposed of by the decisions in the Collingswood Sewerage Company and the Atlantic Coast Electric Railway cases. These were digested in the ELECTRIC RAILWAY JOURNAL of March 30, page 623, and June 22, page 1208. The latter decision, by the Court of Errors and Appeals, upheld State paramouncy in rate-making in reversing a former decision of the Supreme Court. In the meantime, the Supreme Court by its decision in the Collingswood case had already reversed its Atlantic Coast reasoning.

Trenton Six-Cent Fare O. K.

On Oct. 18 Justice Swayze of the New Jersey Supreme Court approved the recent grant of a 6-cent fare to the Trenton & Mercer County Traction Corporation by the Board of Public Utility Commissioners. Most of the points raised by complainants were covered by the contemporaneous decision of Justice Swayze in the Public Service Railway case of which an abstract is published above.

The only argument calling for further remarks in the Trenton case, the justice said, is that the railway lost $86,000 a year by its operation of suburban lines, and that this loss cannot be made up by profits on the operation of lines in the city of Trenton. In the court's opinion, whether the railway shall run some parts of its line at a loss—perhaps with a view to future development on future gain, or perhaps with a view to greater public service—is a business question to be determined by the railway subject to the control of the commission. It is settled that the correct legal test is the effect on the railway's entire line and not upon that part which was formerly a part of one of the consolidating roads. (St. L. & San Francisco Railway vs. Gill, 156 U. S. 649, 665.) The test has recently been applied in the case of an electric railway. (Puget Sound Traction Company vs. Reynolds, 244 U. S. 574.)

In commenting further Justice Swayze said: "A rule which would deprive suburban communities of electric railway service might be much to the advantage of great cities like Trenton but work harm to rural communities, and perhaps be to the disadvantage of the State as a whole. There is a general public interest in having thinly populated and relatively poor sections helped by the more densely populated and richer communities. Public roads are a good illustration. We can readily picture to ourselves the state of our roads if every mile depended for its upkeep upon the revenues traceable to that mile. The law as to railways is settled adversely to prosecutor's contention."

Kansas City Goes to Court

A suit had been filed in the Supreme Court of Kansas in the name of S. M. Brewster, attorney general, asking on behalf of Kansas City, Kan., that the court stop the collection of 1 cent from passengers on Kansas City Railways cars at the State line, and asking that the court oust the company from Kansas. A receiver is also suggested, to administer the property, and an injunction asked, preventing the company from withdrawing any of its cars from service.

This ouster and injunction suit is the second proceeding now pending over the fare situation in Greater Kansas City. It will be remembered that the Public Service Commission of Missouri granted the Kansas City Railways the right to charge a 6-cent fare. The company, however, serves on both sides of the Kansas-Missouri State line. The Public Utilities Commission of Kansas has so far been prevented from holding a hearing on the fare question with reference to an increase in fare on the Kansas side.

Pending decision by the commission, the railway is charging only 5 cents on the Kansas side, and collecting another cent at the State line from passengers who ride across the line into Missouri.

The Public Utilities Commission will hold a hearing on the fare question on Oct. 30.

I. C. C. Allows Increase

W. R. Power, general manager of the Ohio Valley Electric Railway, Huntington, W. Va., recently announced that he had received word from Washington that the company's request for permission to raise the fare had been granted by the Interstate Commerce Commission.

At present the railway has three fare zones: the first, Huntington to Kellogg; the second, Kellogg to Catlettsburg, and the third from Catlettsburg to Ashland. Under the new ruling there will be four zones: first, from Huntington to Kellogg; second, from Kellogg to the Norfolk & Western depot in Kenova; third, from the Norfolk & Western depot to Catlettsburg, and fourth, from Catlettsburg to Ashland.

The fare remains unchanged in the first zone. Ten cents will be charged between Huntington and all points within the second zone. The third and fourth zones carry 15 and 20-cent fares respectively for persons commuting out of Huntington. The local fare within Huntington is unaffected.

A Real Emergency Here

The Public Service Commission of Pennsylvania in an extended opinion by Commissioner James Alcorn on Oct. 18 dismissed complaints against increased fares, including an advance to 6 cents, put into effect last June by the Indiana County Street Railway, but in so doing said that as "the increased cost of operation due to the abnormal conditions now existing is the ground for supporting an increase in the rates of fare it would be only proper that when these conditions cease the old rate should be restored or the company be required to show that it is still entitled to the additional revenue."

The rates are approved until Jan. 1, 1920. The opinion also commends to the notice of the company statements by witnesses that cars are operated irregularly and directs that service be improved.

Grand Rapids Wants Seven Cents

The Grand Rapids (Mich.) Railway has opened its books and bared its financial condition to the City Commission in support of its request for the right to charge increased fares. That statement shows if the company continues to operate on a 5-cent fare basis through 1919, it will lose $173,310, including $100,000 dividends to preferred stockholders.

Benjamin S. Hanchett, president of the company, told the City Commission on Oct. 12 that the company cannot borrow a dollar and that the only financial relief in sight is in increased earning power. In support of that statement, he showed that on the basis of a 6-cent fare, with no decrease in the number of passengers carried, the company would lose about $5,310.

The company has requested that the City Commission deal with the increased fare question directly, and not refer it to the people. Forms of an amended ordinance by resolution have been submitted to City Attorney Taggart for approval, with the request that some commissioner introduce it. That ordinance, as drawn, provides for a 7-cent fare.

The business interests favor the increase. At the hearing on Oct. 12 Lee H. Bierce, secretary of the Association of Commerce, in discussing the request of the railway for the right to charge increased fares urged that the advance be granted, stating that every other public utility in the city had been permitted to advance rates. He said that the railway company must be permitted to earn enough to pay its way.

Transportation News Notes

Springfield (Ohio) Company Wants Increase.—The Springfield (Ohio) Railway has applied to the City Commission for an increase in fare. No specific amount is designated in the request

El Paso Wants More.—The El Paso (Tex.) Electric Railway has applied to the City Council for permission to increase fares from 5 cents to 6 cents, with an increase in half fares from 2½ cents to 3 cents. The Council has announced public hearings.

Straight Five-Cent Fare for Terre Haute.—An order has been issued by the Public Service Commission of Indiana granting the Terre Haute, Indianapolis & Eastern Traction Company the right to charge a straight 5-cent fare on cars in the city of Terre Haute.

Injunction Against Interference With Fares.—The Murphysboro & Southern Illinois Railway, Murphysboro, Ill., filed on Oct. 16, in the Federal Court at Danville, a bill for an injunction restraining the State officials from interfering with the company charging in excess of 2 cents per mile on its interurban line.

Increased Rates for Boulder.—The Western Light & Power Company, Boulder, Col., of which D. A. Hegarty is vice-president, has been authorized to increase rates for electric light, power, steam and gas and to abolish all commutation tickets on the electric railway, by the Public Utilities Commissions of Colorado and Wyoming.

Seven Cents for Ashland.—The Railroad Commission of Wisconsin has issued an order granting a 7-cent fare to the Ashland Light, Power & Street Railway Company, Ashland, Wis. The order provides that cash fares shall be 7 cents with six tickets for 40 cents, while school children's tickets are increased from 2½ to 3½ cents.

Wants More in Benton Harbor and St. Joe.—C. K. Minary, president of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., has addressed a letter to the City Council asking for a conference to discuss the matter of an advance in rates of fare. A similar communication has been sent to the City Council of St. Joe.

North Coast Wants Advance.—The North Coast Power Company, Vancouver, Wash., which owns and operates the railway in that city, and as far out as Sifton, has filed with the Public Service Commission a new schedule of fares between Vancouver and Sifton, advancing the rates about 50 per cent. The price of commutation tickets has also been increased.

Plans to Retaliate.—The City Commission of Sacramento, Cal., has warned the Pacific Gas & Electric Company that if it persists in its application before the State Railroad Commission to raise fares in Sacramento to 6 cents the City Commission will revoke the ordinance which practically put the jitneys out of business in Sacramento.

Seven Cents in Ishpeming.—The Michigan Gas & Electric Company, Ishpeming, Mich., has found it necessary to increase the fare on the line between Ishpeming and Negaunee. The fare has been raised 2 cents on each 5 cents paid. From Lake Angeline to Ishpeming or from Ishpeming or Negaunee to the Union Park the fare is 7 cents and from Ishpeming to Negaunee the fare is 14 cents.

Increase for Syracuse Line.—Increased passenger fares on the Syracuse & Suburban Railroad, Syracuse, N. Y., have been granted by the Public Service Commission for the Second District, in accordance with the petition of the company. The new rates include a 6-cent fare within the city. The other new rates are: 3 cents per mile for cash fares; 2½ cents per mile for ticket fares; 2 cents per mile for mileage book fares; 1½ cents per mile for commutation fares. The road was formerly divided into zones.

Peak Loading Reduced in New York.—At a hearing before the Public Service Commission for the First District of New York on Oct. 17 in reference to the service provided on the lines of the New York Railways, Frank Hedley, vice-president and general manager of the company, stated that the change in business hours ordered by the Health Commissioner had resulted in a material improvement in the service which it is possible for the company to give. The rush hour is now substantially without a "peak," he declared, and hence the conditions are better for the riding public.

Six Cents for Muskegon.—Resolutions were adopted by the City Council of Muskegon, Mich., on Oct. 9, permitting the Muskegon Traction & Light Company to increase its cash fares to 6 cents and its tickets to 5 cents, the increase to become effective only after the company has agreed to provisions for certain improvements in its service, to be completed within six months after the close of the war.

Fare Case Remanded.—The corporation Commission of North Carolina made an order on Oct. 15 certifying to the Mecklenburg Superior Court the record in the case of the Southern Public Utilities Company, Charlotte, in which the commission allowed some weeks ago a petition for the increase of fares to 7 cents, the purpose of the Charlotte authorities being to appeal to the Superior Court from the order of the commission.

Stools for Dallas Conductors.—An order has been issued by the Dallas (Tex.) Railways permitting conductors to use stools and remain seated in operating cars through the residence districts. Heretofore motormen have been permitted to remain seated, but conductors have been forced to stand. All cars in Dallas are of the pay-as-you-enter type, and the use of stools does not interfere with the performance of duty by the conductors.

Tri-City Fare Inquiry.—The Public Utilities Commission of Illinois will send its engineers to investigate and report whether the Tri-City Railway, Davenport, Ia., and the Moline-East Moline & Watertown Traction Company are in need of additional revenues. Both companies have filed petitions for an increase in fares from 5 cents to 7 cents. Later they asked for permission to sell tickets entitling holders to four rides for a quarter.

Tuscaloosa Residents Approve Increase.—The public of Tuscaloosa, Ala., in mass meeting have approved increases in rates for gas, electricity and transportation by the Tuscaloosa Railway & Utilities Company. Fares will be advanced from 5 cents to 6 cents. The people themselves thus have approved the recommendation of a committee named from among them about three months ago to inquire into the matter of an advance in rates and report back. The rate increase was first taken to the City Commission. That body called a public meeting and put the matter up to the residents. The committee employed experts to examine the company's records.

Interurban Increase Restrained.—On an appeal by City Attorney J. C. Lehr of Monroe, Mich., acting on instructions from the City Commission, Judge Jesse H. Root has granted a temporary injunction restraining the Detroit, Monroe & Toledo Short Line Railway from charging in excess of 50 cents as the fare between Detroit and Monroe. Since Oct. 1 the road has been charging 70 cents. The appeal of the city attorney makes the claim that the Monroe franchise limits the fare to 50 cents, and that as only intrastate business is affected, any order by the Interstate Commerce Commission fixing fares at 2 cents a mile, if such an order has been issued, could not apply to the Detroit-Monroe fare.

Personal Mention

Arthur S. Huey has been elected president of the Arkansas Valley Railway, Light & Power Company, Pueblo, Col., to succeed George H. Harries.

Frank M. McShane has been appointed chief engineer of the Jersey Central Traction Company, Keyport, N. J., to succeed W. H. Siebenheller.

Albert E. Ford has been appointed chief clerk of the freight department of the Detroit (Mich.) United Railway to succeed Oliver D. Davis, resigned.

F. C. Rice has been appointed chief engineer of power station of the Vicksburg Light & Traction Company, Vicksburg, Miss., to succeed C. A. Barnes.

E. S. Center, Jr., has resigned as purchasing agent of the Alabama Power Company, Birmingham, Ala. He will be succeeded by Robert Klein.

P. A. Engelhardt has been appointed master mechanic of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., to succeed E. J. Scott.

D. Mabie has been appointed chief engineer of power station of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., to succeed W. H. Lovett.

M. N. Baker has been reappointed supervisor of public utilities by the City Commission of Dallas, Tex., on nomination of Mayor Lawther.

Howard Walker has been appointed master mechanic of the Pascagoula Street Railway & Power Company, Pascagoula, Miss., to succeed J. W. Powell.

M. C. R. Rosenthal has been appointed secretary and treasurer of the Bristol & Norfolk Street Railway, Randolph, Mass., to succeed R. Leslie Ryder.

C. H. Nottage has been appointed master mechanic of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., to succeed L. W. Cotton.

R. T. Langlan has been appointed master mechanic of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., to succeed C. R. Nottage.

M. L. Evans has been appointed purchasing agent of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed W. V. C. Bulkeley.

E. V. Henderson, auditor of the Kansas City-Western Railway, Kansas City, Mo., has also been appointed secretary of the company to succeed S. D. Hutchings.

M. Gildea has been appointed purchasing agent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed Peter D. Hurley, deceased.

William Blake has been appointed superintendent of track of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., to succeed G. C. Welsh.

Wilfred Bellmere has been appointed master mechanic of the Menominee & Marinette Light & Traction Company, Menominee, Mich., to succeed Joseph Rocque.

R. S. Worden has been appointed assistant superintendent of the Concord, Maynard & Hudson Street Railway, Greenfield, Mass., to succeed C. A. Jefts, resigned.

A. W. Spencer has been appointed chief engineer of power station of the Oskaloosa Traction & Light Company, Oskaloosa, Iowa, to succeed C. M. Stryker.

G. H. Goldburg has been appointed chief engineer of power station of the Norfolk & Bristol Street Railway, South Walpole, Mass., to succeed Brigham Hewitt.

Charles Chase has been appointed master mechanic of the Northern Massachusetts Street Railway, with headquarters at Orange, Mass., to succeed J. M. Mellor.

E. M. Sherman, formerly vice-president of the Charles City Western Railway, Charles City, Iowa, has been elected president of the company to succeed C. W. Hart.

E. Van Arsdel has been elected vice-president of the Interstate Public Service Company, Indianapolis, Ind., to succeed Harry Reid, who is now president of the company.

H. Creasey has been appointed master mechanic of the Fort Wayne & Northern Indiana Traction Company with headquarters at La Fayette, Ind., to succeed W. H. Walker.

W. F. McCoy, formerly master mechanic of the Connecticut Company at Bridgeport, Conn., is now superintendent of the reclamation shop of the company at New Haven.

Henry Beckman, treasurer of the North Kankakee Electric Light & Railway Company, Kankakee, Ill., has also been elected president of the company to succeed W. W. Bird.

Harry T. Edgar, formerly vice-president of the Paducah Traction & Light Company, Paducah, Ky., has been elected president of the company to succeed Frederick P. Royce.

F. W. Gates has been elected vice-president of the Charles City Western Railway, with headquarters at Marble Rock, Iowa, to succeed E. M. Sherman, now president of the company.

R. E. Skow has been appointed engineer of power station of the Fort

Dodge, Des Moines & Southern Railroad, with headquarters at Fraser, Iowa, to succeed B. H. Bryson.

W. K. Morley has been elected president of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., to succeed R. Schaddelee, resigned.

James T. Clark has been appointed chief engineer of power station of the New York & North Shore Traction Company, Roslyn, N. Y., to succeed David Craft.

C. F. Bloom has been appointed chief engineer of power station of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, to succeed Charles W. Carson.

J. O. Bradfield, general freight agent of the Scioto Valley Traction Company, Columbus, Ohio, has also been appointed general passenger agent of the company to succeed N. E. Rees.

John H. Clark has been appointed claim agent of the City Railway, the Oakwood Street Railway and the People's Railway, all of Dayton, Ohio, to succeed Alvin Coffman.

Joseph Turner has been appointed chief engineer of power station of the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, to succeed F. Moulten.

Justice Wilson, formerly vice-president of the Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, has been elected secretary of the company to succeed S. B. Sneath, Jr.

E. M. Monsell has been appointed treasurer of the Sand Springs Railway, Tulsa, Okla., to succeed Charles Page, who retains his position as president of the company.

F. M. Ames has been appointed superintendent of railways of the Northwestern Ohio Railway & Power Company, with office at Genoa, Ohio, vice. P. R. McComas, resigned.

Raymond Hunt, formerly assistant general manager of the Tidewater Power Company, Wilmington, N. C., has been appointed general manager of the company to succeed A. B. Skelding.

George Sprague, Jr., has been appointed assistant secretary and assistant treasurer of the Northern Ohio Traction & Light Company, Akron, Ohio, to succeed G. H. Bourne.

R. D. Sneath has been elected vice-president of the Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, to succeed Justice Wilson, who has been appointed secretary of the company.

D. T. Gaston has been named as general manager of the Columbus Railway, Light & Power Company, Columbus, Miss., to succeed Charles Hays, who recently resigned to enter government service.

C. F. M. Niles has been elected treasurer of the Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, to succeed L. S. Sneath, who still retains his position as president of the company.

C. F. Greenburg, purchasing agent for the Lincoln (Neb.) Traction Company, severed his connection with the company effective on Oct. 3. His successor will be appointed and announcement made at an early date.

F. M. Olyphant has been appointed secretary of the Plattsburgh (N. Y.) Traction Company to succeed W. H. Elder, who resigned to become connected with a firm of public accountants in New York City.

J. C. Duke has been elected vice-president of the Dallas (Tex.) Railway to fill the vacancy caused by the death of Herbert M. Hughes, who succumbed recently to pneumonia following an attack of Spanish influenza.

H. L. Barber, formerly assistant treasurer and general manager of the Plattsburgh (N. Y.) Traction Company has been appointed treasurer of the company to succeed H. F. Atherton. Mr. Barber will retain the position of general manager.

J. P. Peurrung, former vice-president and general manager of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, who severed his connection with the road several years ago, has returned to the management of the line, succeeding Charles C. Harris, resigned.

Frank Wade has been appointed master mechanic of the Empire State Railroad Corporation, Syracuse, N. Y., to succeed A. B. Metcalfe, who, as noted in the ELECTRIC RAILWAY JOURNAL for June 29, resigned to enter the machinery and supply business under the firm name of the Reliable Supply Company, at Syracuse, N. Y.

John S. Simpson has been appointed auditor of the Washington Water Power Company, Spokane, Wash., to succeed Parkinson Hayward, resigned. Mr. Simpson was formerly auditor of the State Public Service Commission. He was at one time with the General Electric Company and practiced as a certified public accountant in New York.

William D. Ray, formerly vice-president and general manager of the Pennsylvania Utility Company, Easton, Pa., has been commissioned as a major in the Quartermaster Corps, Construction Division, War Department. Major Ray's work will be that of utility officer at one of the cantonments, where he will have charge of the lighting and other utility services.

Dr. Robert F. Hyland, chief surgeon of the United Railways, St. Louis, Mo., who volunteered his services to the government for military duty several months ago, has been accepted and will soon be serving in the Medical Corps, U. S. A. A handsome wrist watch was presented to Dr. Hyland recently by Richard McCulloch, Thomas E. Francis, Edwin D. Smith and Bruce Cameron, all connected with the railway. Dr. Hyland will depart soon for Fort Oglethorpe, Ga., for preliminary service before going abroad.

Obituary

Allan C. Choate, purchasing agent of the Eastern Pennsylvania Railways, died of pneumonia on Oct. 13, in Pottsville, Pa. He was a son of Joseph K. Choate, vice-president of The J. G. White Management Corporation, New York, N. Y.

Andrew Jackson Hutchinson, aged eighty-five years, died on Oct. 13 at Babylon, Long Island. He had been ill with pneumonia for only two days. He was in the railroad contracting business and built city railway lines in New York City and at Jacksonville.

D. D. Schenck, president of the Toledo & Indiana Railroad, died at his home in Toledo, Ohio, on Oct. 12 from the effects of influenza. Besides his connection with the railroad, Mr. Schenck was president of the S. C. Schenck Coal Company, director of the First National Bank and the Union Savings Bank and a stockholder of the S. C. Schenck Coal Company, Chicago.

Herbert M. Hughes, vice-president and a member of the board of directors of the Dallas (Tex.) Railways, died at his home in Dallas recently following an attack of Spanish influenza which developed into pneumonia. Mr. Hughes was thirty-five years of age. In addition to his traction interests, he was head of one of the largest wholesale grocery businesses in Texas. He was also president of the Texas Wholesale Grocers' Association.

Carl H. G. Johnson, engineer in the railway and traction department of the General Electric Company, Schenectady, N. Y., died of pneumonia on Sept. 26. He had but recently taken up special government work in connection with the Division of Transportation and Housing of the Emergency Fleet Corporation. Mr. Johnson was born in Sweden but came to this country at an early age. He had been in the employ of the General Electric Company for seventeen years.

Leonard S. Cairns, general manager of the Eastern Pennsylvania Railways, died of pneumonia on Oct. 10 at Pottsville, Pa. He was thirty-six years of age. Interment was made at Minneapolis, Minn., his former home. For a number of years Mr. Cairns was general superintendent of the Twin City Rapid Transit Company of Minneapolis and St. Paul, Minn. In 1912 he resigned from the operating organization of that company to join the staff of The J. G. White Management Corporation, New York, N. Y., and was assigned to the position of assistant general manager of the Manila Electric Railroad & Light Company, Manila, P. I. He was promoted by the management corporation in 1917 to the office of general manager of the Eastern Pennsylvania Railways, Pottsville. Pa.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

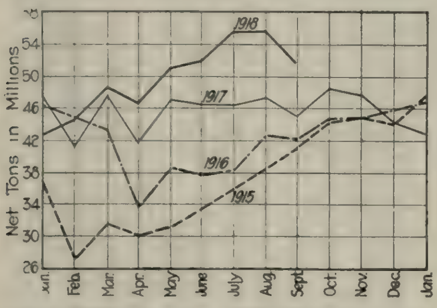
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Output of Coal Is Still Falling Off

Production for First Nine Months of Current Year Estimated at 447,905,672 Net Tons

The production of bituminous coal during the week ended Oct. 12 is estimated at 12,321,000 net tons, a decrease compared with the week preceding of 273,000 net tons or 2.2 per cent, but an increase over the corsponding week of last year of 1,317,000 net tons or 12 per cent, according to the weekly report of the Geological Survey. The average production per working day during the current week is estimated at 2,053,000 net tons as compared with 2,099,000 net tons during the week of Oct. 5, and 1,834,000 net tons during the week of Oct. 12, 1917.

Bituminous coal production during the month of September, 1918, is estimated at 51,687,031 net tons, and exceeds production during the same month of 1917 by 6,579,073 net tons or 14.6 per cent. September production, limited, first, by loss of time on Labor Day; second, loss of time on Registration Day, and third, by the short month, was approximately 4,000,000 net tons less than production during either July or August, and fell slightly below the production of June but exceeded all records prior to June, 1918.



PRODUCTION OF BITUMINOUS COAL 1915-1918 INCLUSIVE

For the first six months of the coal year 1918, production of bituminous coal is estimated at 312,282,414 net tons as against 274,537,172 net tons during the same period of 1917 or an increase of 37,745,242 net tons or 13.7 per cent. The requirements during these first six months of coal year 1918, however, exceeded the production during these months of last year by 49,448,828 net tons, so that even with the large increase, production during the first half year fell 11,703,586 net tons or 3.7 per cent behind the estimated requirements.

Production for the first nine months of the calendar year of 1918 is estimated at 447,905,672 net tons, an increase over the same nine months of 36,179,783 net tons or 8.7 per cent. This tremendous increase over last year was really brought about during the months of July, August and September, the increase during this period amounting to 24,234,681 net tons or 17.4 per cent, and more than doubled the improvement that occurred during the first six months of the calendar year, the increase during this period over last year amounting to but 11,945,102 net tons, or 4.4 per cent.

ANTHRACITE OUTPUT DECREASES 4.7 PER CENT

For the week ended Oct. 12, 1918, production of anthracite is estimated at 1,955,000 net tons, a decrease of 4.7 per cent, compared with the week of Oct. 5.

The daily average during the current week of 326,000 net tons was lower than the daily average for the coal year to date during either 1918 or 1917. Total production for the coal year to date now amounts to 55,658,000 net tons compared with 54,683,000 net tons for 1917, an increase of 1.8 per cent.

Production of Carmen's Badges Cut

War Industries Board Curtails Output to 75 Per Cent of Six Months Production of 1917

The manufacturers of badges worn by conductors, motormen, inspectors, etc., have for some time past reported a considerable shortage of supplies on hand. The recent ruling of the War Industries Board curtailing the manufacture of metal tags or badges for industrial purposes to 75 per cent of six months production of 1917 will tend toward making this shortage more acute.

Owing to the difficulty of obtaining metal, shipments are from six weeks to two months behind and prices in the past year have risen about 50 per cent. As far as can be learned there has been no attempt on the part of the manufacturers to use a substitute in place of metal.

Shortage in Railroad Picks

The government is now in the market for about 600,000 railroad picks, which will most likely, with what government orders are already on hand, tie up the market in this field for quite a few months.

Much Activity in Fare Box Market

Replacements and New Collection Methods Because of Higher Fares Account for Most of the Orders

Due to the gradual awakening to the necessity for increased fares and the subsequent granting of same, there has developed a need for much revision in the methods of fare collection. This has opened up the whole fare-box situation and the manufacturers have been active in working out the needs of the industry and in supplying equipment to meet the changed conditions. As a joint result of increased fares and the foresight of the manufacturers, there is at present much activity in the fare-box market.

The statement is made by one manufacturer that the demand during July, August and September last equaled 75 per cent of the demand for any preceding entire year.

ENORMOUS INCREASE IN NUMBER OF PENNIES HANDLED

As a natural result of the changes from a 5-cent fare to either a 6-cent fare or a zone system that have occurred, the number of pennies handled has increased enormously. The old method of locking up the pennies in counting type fare boxes has in these increased fare cases become inadvisable, if not impossible. The manufacturers state that too much emphasis cannot be placed on the value of metal tickets in the elimination of pennies, and in the consequent speeding up of loading and unloading.

Fare-box orders for the most part are either for replacement of other methods of collection or for the changing of equipment formerly designed to handle only the 5-cent fares. New rolling stock being built to serve war industries such as shipbuilding, coal, munitions, etc., furnishes some demand for boxes, to be sure, but it is said that this is only a small percentage of the total.

No supply is being carried in stock by the manufacturer chiefly because it is impossible to keep up with the demand. Some trouble is being experienced in obtaining sufficient quantities of steel and bronze and this gives rise to further delay so that about ninety days is necessary in which to fill orders for any considerable quantity of boxes.

Prices on some boxes advanced several months ago and those of another manufacturer were advanced $5 per box about ten days ago.

Industrial Preparations for Peace

Many Problems Relating to Labor, Return of Output to Peace Products, Foreign and Domestic Market Conditions and Possibilities Should Receive Consideration Quickly

The recent plea of Germany and Austria for an armistice should impress upon manufacturers in this country the necessity for preparation for peace. President Wilson's replies to Germany's notes mean that the peace which is to come will not be "Made in Germany." Nevertheless, it may hasten the time of the arrival of the real peace, and while the doughboys' wish of "Hoboken, home, Heaven" may not be realized by Christmas, the German collapse cannot be far off. Already this event is being presaged in the stock market by lower quotations on munitions stocks and higher prices for the railroads and public utilities.

The peace problems which confront our industrial establishments after the war are many. Among them are the following:

What will be done with all of the workmen now engaged in the industries connected directly with the war, such as munitions and arms, and the supply of raw material for these manufacturers, as well as with those indirectly connected with the war, such as the building of ships.

To what uses will the manufacturers put the immense manufacturing establishments which have been created and equipped with tools solely to manufacture war materials?

What arrangements will be made to absorb into industry the large number of men gathered for war purposes, including some 1,800,000 in France and others in this country?

Will the employment of women in industrial establishments undertaken as a war expedient become permanent?

As a nation we have been slow in taking up this matter. Our Allies and even Germany have had committees considering the matter for some time. That Congress has at last awakened to the necessity of some action is shown by the fact that there is now a joint resolution covering the matter, before both branches of Congress, introduced by Senator Weeks and Congressman Madden, as well as a bill before the Senate introduced by Senator Overman. The purpose of this legislation is for the government to make a thorough study of after-the-war trade, though the proposal in one case is that the study should be conducted by a congressional committee while in the other case the investigating body proposed is a commission to be appointed by the President. This proposed government action, however, does not relieve any manufacturer from considering the matter so far as his own property is concerned. Indeed, it is not improbable that before any of the committees mentioned can be appointed and conclude its deliberations, peace will be here.

There are, of course, but two logical ways for each manufacturer to approach the question. The first is the extent to which he can find a domestic market for his peace-time products, the second, the extent to which he can command a foreign market for his goods.

There is no doubt that there will be great need for materials of nearly all kinds when the war is over. Not only have many necessary improvements been postponed because of inability to secure material, but for the same reason many industries, the electric railway companies for example, have gone without material really necessary to maintain their properties because it could not be had. Finally, the stockrooms and stock shelves of a great many retailers as well as users have been swept bare, and artificial means have been taken by the government to reduce production, such as standardization along many lines. Some of this standardization will probably be retained after the war, but in some cases the different patterns represented real needs, and while the suppression of so many varieties was a legitimate war measure, their production undoubtedly will be renewed after the war.

Uncertainty of Foreign Markets

Foreign countries present a very similar condition to that described as characterizing America. In addition, many of those farthest distant have suffered under the handicap of greatly reduced shipping facilities so that in some respects their need for manufactured articles is greater than our own. These will have to be supplied and the devastated regions of Europe rehabilitated. All this calls, or would seem to call, for an output comparable, almost, with that at the present time.

On the opposite side we have, as regards foreign trade, probably greatly reduced shipping facilities. In spite of the tremendous activity of our shipping yards, the toll of the U-boat has not been small. Besides, this country will have in Europe at the close of the war, a great many men who will have to be returned to this country, and for some time at least many bottoms will be required for this task. Our European Allies, as well as the neutral countries, and as far as possible the Central powers will endeavor to have their share of any foreign business, so that there will be competition.

The domestic market is subject to considerable uncertainties also, mainly because of the labor situation. We can hardly expect to do very much export business if labor receives the same rates of pay as at present, but will it accept less?

One solution for the problem, and it may prove to be the correct one, is greatly to enlarge the use of manufactured articles in this country so as to utilize the manufacturing space in our factories, created for the war, but available now for peace production.

For instance, take the railway situation. It is a well-known fact that owing to the lack of incentive to capital, practically no new electric railway mileage has been built during the past ten years. During this time the population of the country has increased probably 25 per cent and in purchasing power still more, so that with improved conditions in the electric railway field as regards incentive to capital, much could be done.

Again, the same conditions practically prevail as regards steam railroad electrification. The few installations which have been made have shown that electric equipment can pay for itself in a very few years under many circumstances, owing to its ability to utilize the track more intensively that can steam locomotives. This means that on mountain divisions and on congested sections of steam railroads in the large cities where additional track construction would be expensive, there will be a demand for electric equipment. In fact, in many of these situations it would have been introduced long ago but for the financial inability of the steam railroads to finance the installation. No one knows what the future of the steam railroads is to be after the war, but it is safe to say that they will not be permitted to return to the unfortunate financial condition in which they existed before the war owing to the shortsightedness of the Interstate Commerce Commission. Whether they return to private ownership or remain under government ownership, public opinion will require them to be rehabilitated so that they can render the transportation service which the country demands.

Finally, there is no doubt that among the municipal improvements which will be inaugurated after the close of the war, rapid transit will occupy first place in many communities. New York, indeed, was fortunate in concluding its rapid transit agreements and almost completing construction work before 1914. In other cities, the rapid transit program was interrupted and nothing was done in the way of active work, but Philadelphia, Cleveland, Detroit, Chicago, and Los Angeles have all prepared rapid transit plans, and they will undoubtedly be revived in many of these places when the opportunity returns for municipalities to raise funds at reasonable rates.

We have recited the prospects for industrial activity with particular reference to electric railway industry, because we are more familiar with that industry than with any other. But other lines are destitute of material as well, and there seems to be no reason why the termination of the war should not see a great activity in industrial lines. Each manufacturer should be prepared to take advantage of it.

Franchises

Johnstown, Pa.—The Johnstown Traction Company has asked the City Council of Johnstown for an extension of time on its franchise granted last year for the completion of projected extensions in Moxham and to Constable Hollow Park. The company was asked by the government to discontinue work on the Horner Street extension and not to start work on the Moxham tracks because of labor shortage and other conditions brought about by the war.

Pittsburgh, Pa.—The Pittsburgh Railways has received a ten-year franchise from the City Council of Pittsburgh for the construction of a crosstown car line loop, the cars to run up Sixth Avenue, turn on Ross Street and go down Fifth Avenue to the Northside.

Track and Roadway

Calgary (Alta) Municipal Railway.—The question of a new route for the Ogden car line is being considered by the City Council of Calgary. Work will be begun as soon as the matter is settled. An extension will be built by the municipality which will cross the city limits at Fiftieth Avenue, W., and will cross the prairie in an almost direct line to the new hospital site.

San Diego (Cal.) Electric Railway.—A report from the San Diego Electric Railway states that it expects to construct a 1-mile extension of its Logan Heights line to the Pacific Marine Construction Company's shipbuilding plant.

Washington, D. C.—A favorable decision has been reached by the War and Navy Departments for the establishment of a belt line at Washington, D. C., to relieve electric railway congestion in the center of the city and to accommodate government workers in West Potomac Park. The line will be used by both the Capital Traction Company and the Washington Railway & Electric Company. The plan involves the laying of new tracks over a portion of the route. The government will either construct them or guarantee the cost. The District Commissioners have turned the matter over to the Bureau of Industrial Housing. Otto M. Eidlitz is director of the bureau, and has full power to build any railway necessary to accommodate war workers.

Springfield (Ill.) Consolidated Railway.—Announcement has been made by A. D. Mackie, general manager of the Springfield Consolidated Railway, that plans are under way for important additions to the company's system after the war. A study is being made of the present lines and the facilities they offer for development.

United Railways & Electric Company, Baltimore, Md.—An extension will be built by the United Railways & Electric Company of its Sparrows Point line to the yards of the Bethlehem Shipbuilding Corporation.

United Railways of St. Louis, St. Louis, Mo.—Cars are now being operated on the new City Limits line of the United Railways of St. Louis. The new line extends along the city limits from Maplewood to Wellston and forms a link connecting all the downtown lines from Manchester to Easton Avenue.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—A contract has been awarded by the Trenton & Mercer County Traction Corporation to J. J. Barrett Company for the replacing of old ties with new ones on its Pennington and Hopewell divisions.

London & Lake Erie Railway, London, Ont.—It was recently announced by the London & Lake Erie Railway that operation would be discontinued on the line and the work of scrapping the road would be begun immediately. The city of London is considering the purchase of 8 miles of the road extending between Lambeth and London.

Duquesne Street Railway, Pittsburgh, Pa.—Arrangements have been completed by the Duquesne Street Railway for the construction of a line on Fifth Avenue, Ross Street and Sixth Avenue.

Pittsburgh (Pa.) Railways.—Application has been made by the Pittsburgh Railways to the city for permission to construct and reconstruct tracks with paving on the following streets, at a total cost of about $626,400: Chartiers Avenue, East Ohio Street, Butler Street, West Carson Street, Fifth Avenue, Liberty Avenue, Federal Street, West Ohio Street, Preble Avenue and other streets.

Dallas, Tex.—The City Commission of Dallas, on petition of E. P. Turner and associates, owners of the Dallas Northwestern Traction Company, and the Dallas Southwestern Traction Company, has granted extensions of all franchises for the duration of the war and for a period of one year thereafter. In asking this extension, Mr. Turner stated that, because of the war, his company had been unable to secure building material and had also been unable to get labor to carry forward construction work. The Dallas Northwestern Traction Company proposes to build an interurban line from Dallas northwestward to Denton and Slidell, and the Dallas Southwestern Traction Company plans to build a line from Dallas southwestward to Cleburne and Glen Cove. In the conditions of the extension, the two companies gave up franchises over all city streets with the exception of two blocks over which their lines will enter the city. Mr. Turner represented to the commission that during the eleven years that his companies had held these franchises they had paid $5,500 in taxes to the city and had received no direct benefit therefrom. The City Commission agreed to fix a bonus tax of $100 a year on the franchises as extended in lieu of other taxation during the period of the war. [Nov. 24, '17—May 4, '18.]

Northern Texas Traction Company, Fort Worth, Tex.—A contract has been awarded by the Northern Texas Traction Company to the Union Switch & Signal Company for the necessary material to be used in connection with the extension of the automatic block signaling on its line between Fort Worth and Dallas. The extension will include six blocks operating under the Traffic Direction Block system, one block for complete curve protection on single track and four blocks for double-track signaling for rear and curve protection. The installation will be made by the railway company's forces.

Lewisburg & Ronceverte Electric Railway, Lewisburg, W. Va.—This company reports that it is building an extension to Main Street and Lewisburg Avenue.

Power Houses, Shops and Buildings

New York Central Railroad, New York, N. Y.—A contract has been awarded by the New York Central Railroad to Ruggles-Robinson & Company, New York, for the erection of a bridge on Forty-second Street, connecting Grand Central Station with Fourth Avenue, to cost about $50,000.

Choctaw Power & Light Company, McAlester, Okla.—Plans are being made by the Choctaw Power & Light Company, which supplies energy to the Pittsburgh County Railway, for the construction of an electric plant and distribution system in Hartshorne.

Pacific Power & Light Company, Portland, Ore.—A number of water power sites have been purchased by the Pacific Power & Light Company on Hood River for possible development after the war ends. A survey has been made for a pipe line from a dam site near Wynans to Ruthton and right-of-way for such line has been secured.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company recently completed a transmission line, carrying 11,000 volts, from Portland, Ore., across the Columbia River to Vancouver, Wash. This makes three of its lines which cross that stream and connect substations in the two cities.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—A contract has been awarded by the Charleston Consolidated Railway & Light Company to J. A. P. Crisfield Contracting Company, Philadelphia, Pa., for improvements to its plant to cost $750,000.

Seattle, Wash.—An ordinance is before the City Council authorizing an issue of $1,750,000 for extensions and permanent improvements to the municipal lighting department. It is proposed to take up the light department warrants, issued to pay for permanent improvements, build the Spokane and Ballard Street substations, pay for the proposed connection of the municipal and the Puget Sound Traction, Light & Power Company's power plants, and to provide a fund to cover extensions for the next three years.

Rolling Stock

Cameguay (Cuba) Electric Company, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 19, has purchased from the J. G. Brill Company, Philadelphia, six open passenger cars.

Savannah (Ga.) Electric Company has asked for prices on twenty safety one-man cars. As far as could be learned orders have not been placed.

Jacksonville (Fla.) Traction Company has asked for prices on twenty-five safety one-man cars. As far as could be learned orders have not been placed.

St. Louis (Mo.) Municipal Railway has placed an order for two one-man safety cars with the National Safety Car & Equipment Company. These cars will be built by the Cincinnati Car Company.

Galveston-Houston Electric Company, Galveston, Tex., has received three rebuilt interurban cars which have been put into service on the Galveston-Houston Interurban. Another rebuilt car is on the way and will also be put in this service when it arrives.

Colorado Springs & Interurban Railway, Colorado Springs, Col., has placed an order with the National Safety Car & Equipment Company for twenty-four safety cars. These cars will be built by the Cincinnati Car Company and will be delivered in December.

New Brunswick Power Company, St. John, N. B., may be in the market later for one-man cars. The Royal Commission, which recently authorized the company to increase its fare to 6 cents, also recommended to the company the introduction of one-man cars.

Gary & Valparaiso Railway, Gary, Ind., has obtained a loan of $33,000 from the government and has contracted to spend the amount for new passenger and freight cars, the cars to be of steel construction and to accommodate sixty-five persons. The railway company must pay 5 per cent interest on the loan during the period of the war and later, if it desires, can buy the cars at cost, less depreciation.

Trade Notes

Chicago Pneumatic Tool Company of Massachusetts announces the appointment of B. H. Tripp as district manager of sales, Pacific Coast territory, succeeding M. W. Priseler.

G. F. Heffler has been chosen to succeed M. A. Curran as manager of the line material department of the Western Electric Company. Mr. Curran has been appointed assistant manager of the company's Philadelphia house.

Milliken Brothers Manufacturing Company, Inc., New York City, has been organized to succeed Milliken Brothers, Inc., established 1857, taking over certain assets, including patent rights, good will, etc., of the former company. The new company will specialize in the manufacture of galvanized-steel transmission towers. The new organization will also manufacture galvanized-steel wireless towers, special steel poles for distributing and interurban railway lines, as well as the standardized truss unit system, a patented system of construction for steel buildings, designed by J. E. Jennings, vice-president and secretary of the company and for many years in charge of the power transmission department of the former company. C. T. Clack, for many years connected with the United States Steel Corporation, is president of the company, and Robert Grant, iron and steel merchant, is treasurer. General offices will be in the Woolworth Building.

New Advertising Literature

Walter A. Zelnicker Supply Company, St. Louis, Mo.: Bulletin No. 252, or that for Oct. 15, 1918, devoted largely to storage tanks, pressure tanks and tanks for other purposes.

Armco Iron Culvert & Flume Manufacturers' Association, Chicago, Ill.: Sixteen-page folder entitled "Somewhere in the U. S. A." and containing views of installations of corrugated iron culverts in different cantonments.

Peacock Staffless Brakes

are on those 100 Hog Island Cars

Service to and from the great Hog Island shipyards brooks of no preventable delays.

So the Emergency Fleet Corporation and the Philadelphia Rapid Transit Company ordered for its 100 train-operated cars up-to-date devices to insure both *safety* and *service*. Among the devices that made good in the class of *safety* and *service* was the Peacock Brake of which the *staffless* type was chosen to promote quickest possible interchange of passengers.

There are Peacock *designs* for every condition but there is one Peacock quality common to all of them—

Safety and Service

National Brake Company

Buffalo, N. Y.

The Peacock Staffless

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
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Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
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REPORTS • DESIGNS • CONSTRUCTION • MANAGEMENT
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You are a faithful subscriber and reader of the Electric Railway Journal. You know how useful it is to you. Why not give us the names of those of your electric railway friends who would also benefit by being subscribers to the Electric Railway Journal? We will be glad to send specimen copies to any names and addresses that you mention.

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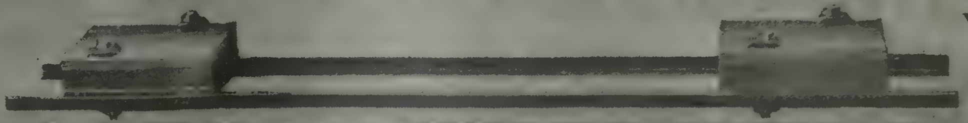
EVERY WEEK

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Scofield Engineering Co. Consulting Engineers
PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

The MECHANICAL RAILWAY TIE



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Can Be Laid
by using
D.M. Ties all
the way!

Permanent—
Resilient—
Economical

Are the Result
of careful
construction.

And the best and most careful method known so far is that of using D.M. Ties.

And these Ties have **Made Good** with a vengeance.

Dayton Mechanical Railway Ties are not only a **theoretical** solution of track troubles. They are the **practical** outcome of years of work and tests on track carrying both city and heavy, high-speed, interurban cars.

Write for full particulars.

THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
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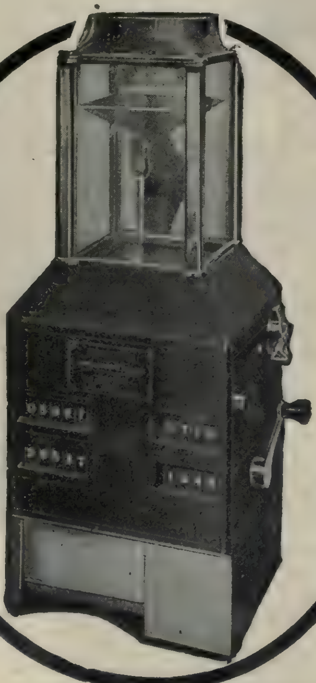
On the Chicago and Joliet

Referring to the service given by Johnson Fare Boxes, the Chicago and Joliet Electric Railway Co. writes:

"We installed 25 Johnson Fare Boxes in the cars on our city lines, December, 1916, and they have been in constant use ever since. They have rendered very satisfactory service and have given very little mechanical trouble. The continuation of their use in service on our lines is our best recommendation as to their merits."



Solves the problem of Fare Collection and Fare Accounting

The Johnson Fare Box protects the company against loss of fares by making the conductor a change maker instead of a fare collector.

It puts fare collection on a business basis and eliminates all haphazard methods of accounting by the conductor.

Johnson Fare Boxes installed in your cars will insure 100 per cent collection and accurate accounting. They will give your conductors more time to attend to other duties.

Over 10,000 in use on prominent railways. Full details on request.

Johnson Fare Box Co.
Jackson Blvd. & Robey St., Chicago
50 East 42nd St., New York.

Will You Take a Little Trouble to Help These Boys Have Comfort?

The Y. M. C. A. needs *men* for war service. The nation has given generously in *money* for this work but *money* won't do everything—certainly not in war.

The Y. M. C. A. is in special need of men to serve as ***Truck Drivers and Mechanics.***

75 Drivers and 25 Mechanics every month.

We are making this appeal to the business men—the employers of the country to get those men for us.

The Y. M. C. A. service behind and on the battle lines is a highly organized business. And as in every other big business, transportation is one of its greatest needs.

The canteen stocks have to be kept moving or the boys go without the comforts they crave so much—tobacco—chocolate—pastry—little army "luxuries."

After a long march or a hard fight or a trick in the trenches the boys flock to the "Y" canteen. And it sure is tough if the "Y" man has to say "Nothing doing boys, the truck didn't get in today." Suppose *your* boy were there!

The Y. M. C. A. does not want men who are eligible for the army. But there are men in this country (lots of them) who are over 37 years old and are not in Class 1 of the draft and who know how to drive a truck or keep an engine in shape. We want *them.* We want 100 a month.

Maybe you have a man with that training working for you or you know such a man somewhere. Maybe he has not realized how much he can do to help the boys. A little talk from you would start him our way

Will you act as a recruiting officer to get that ma for us?

There is no *profit* in this work for any man who serve but he will get his living and his family, if he has one will be taken care of and all his life he will rejoice ove the service he has rendered. Talk with men you kno who might do this work. Explain to them the *need* fo their service. Get them interested and thinking.

In order that you may talk to such men on the bes basis fill in and mail the coupon and we will furnis full information.

Help us get these Men

Ed M. Willis,
Y. M. C. A., 347 Madison Ave., New York.

It may be possible for me to get recruits fo Y. M. C. A. truck service in France. Please send m full information regarding that service.

Signature . . . .

Street and No . . . .

Town and State . . . .

Order Now

Columbia Trolley Wheels For Winter Weather

OUR splendid foundry facilities enable us to turn out perfect trolley wheels by the thousands at moderate prices.

In addition to our standard solid trolley wheels for general service, we direct your attention to the

Columbia Sleet Cutting Wheel

The ideal trolley wheel for insuring uninterrupted collection of current during the prevalence of hail, sleet, snow or ice. Does its work effectively without the aid of auxiliary sleet-cutting devices. **Beat Winter to it,** by ordering your Columbia sleet wheels now!

Columbia trolley wheels of both types in diameters of 4-in., 5-in. and 6-in. are in stock ready for immediate shipment. You can meet many other of your wants by ordering from this general list of Columbia products.

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- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
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- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

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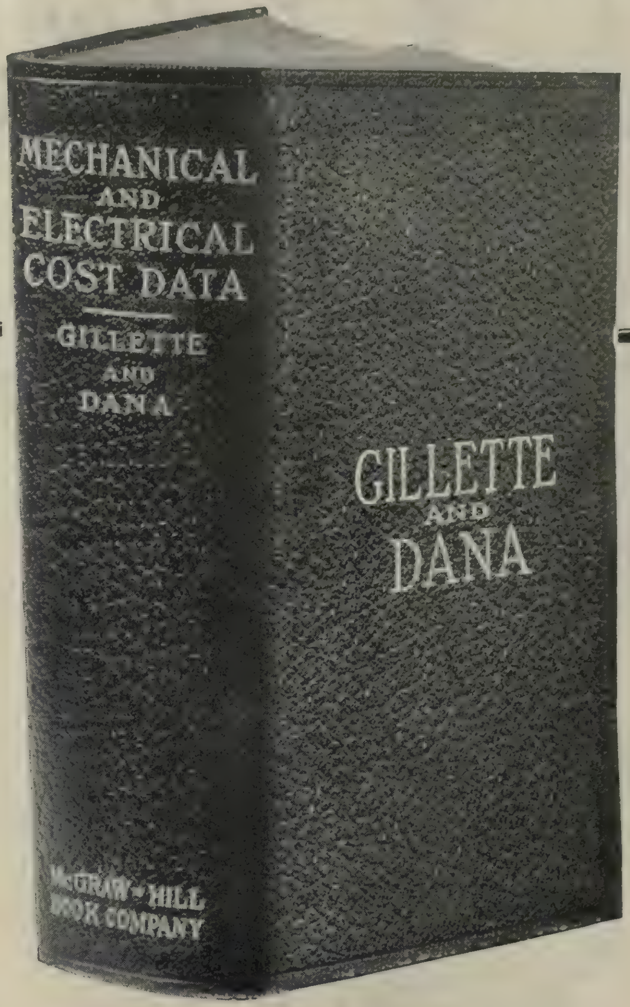

For more than 20 years the authors of this new handbook have specialized in cost data, and during that time have conducted detail appraisals aggregating $650,000,000. They believe the cost data presented in this book will be useful to others because these data have been indispensable to them.

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MR. HENRY KREISINGER, engineer of the U. S. Bureau of Mines, Department of the Interior, during a consideration of the fuel problems of the country at the Spring (1918) Meeting of the A.S.M.E. stated, "The essential requirement for economical burning of high-ash fuels is a continuous and automatic removal of ash from the furnace, so that the operation of the boiler need not be interfered with by frequent cleaning of fires."

Speaking of a boiler test made by the Government he stated, "The fire was cleaned every hour. On account of the necessity of this frequent cleaning the average capacity fell below the rating of the boiler, although between the cleaning of the fire, the capacity developed was above the rating. It was also due to this frequent cleaning that the stack losses were high."

The Chain Grate is the only type of stoker that *positively, continuously* and *automatically* carries the fuel *through* the furnace and discharges the ash *from* the furnace. It is the only type of stoker that is self-cleaning—always presenting an ideal and clean grate surface—that does not require periodical pokings and cleanings to obtain proper combustion and highest efficiency. It is the only type of stoker that will insure the greatest economy in the burning of your *high*-ash coals.

Our engineers will be glad to help you solve your low grade *high*-ash fuel problem. Their long specialized experience and accumulated data will be helpful to you.

We will arrange for prompt delivery of Green Chain Grates to plants handling essential work.

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CHAIN GRATES

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When a railway changes from slow acceleration to fast acceleration, as in the case of safety cars, it takes the operator a few days to get used to the new conditions of fast braking as well as fast acceleration.

This period will have no accident terrors for you if you equip your cars with H-B Life Guards.

The sure protector of life and limb for any type of city or suburban car.

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Turning Scrap Into Service

Your scrap heap is a monument of loss—a graveyard of profit. But there is still service in many of the old armature shafts, flat wheels, gears and other important parts if they are reclaimed by the Erico Portable Welding Rheostat.

This outfit truly pays its way, for, while it is a time, money, labor and equipment saver in the shop, it is an excellent bonding outfit when used in connection with the Erico Portable Bonder.

Its exceptionally light weight, portability and large voltage range have appealed to many users.

Let us send you full details of this service aid.

The Electric Railway Improvement Co.
Cleveland

Better Results from Stokers

Williams Coal Crushers reduce run of mine and lump coal to the proper size for stoker use—that means greater efficiency from fuel—coal and money saved.

Owners of Automatic Stokers have been experiencing great difficulty in obtaining properly graded coal—many have found a timely solution to this difficulty in Williams Crushers. Recent installations of Williams Crushers for reducing lump coal to stoker sizes have been made in the following plants.

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Williams Crushers enable you to produce a better grade of coal than can be obtained in slack and screenings direct from the mines. They are adaptable to all conditions—adjustable to most all sizes of crushing. Their output is free from fines, as far as it is possible to control degradation.

Complete information, description, etc., will be found in Bulletin No. 91

5000 Williams Crushers are now in use. Hundreds of Williams Crushers are reducing thousands of ton of run of mine and lump coal to stoker sizes daily.

The Williams Patent Crusher & Pulverizer Co.
General Sales Department
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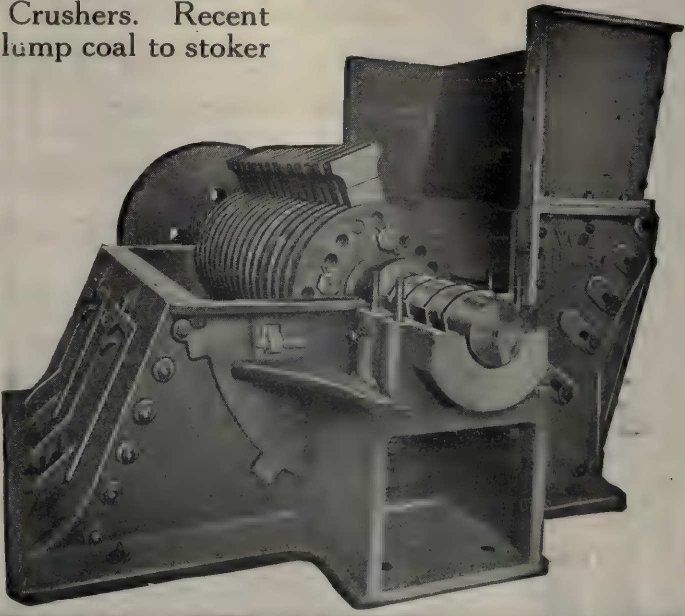

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Much of this is used in the manufacture of gas to be used in warfare.

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Otherwise our soldiers will be needlessly sacrificed.

Our Government has beaten Germany at her own game.

We make a better gas, one that is deadlier and drives back the enemy more efficiently than any gas they have.

There must be no shortage of sulphur because every pound of it made into gas saves our own men and helps speed up our final victory.

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There are only two sulphur mines in America.

There is not enough sulphur for both the great quantities of gas needed and the tons of paper that we thoughtlessly waste.

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Save the Paper

and help choke the fiendish Hun
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ELECTRIC RAILWAY JOURNAL

Johns-Manville
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Requires less excavation and less pack refill

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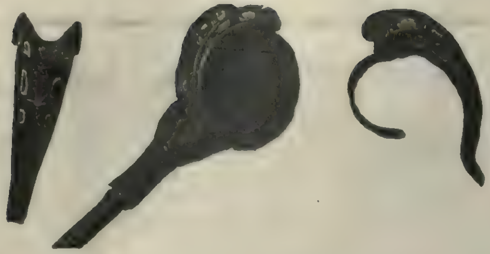

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The proper equipment is Nuttall Union Standard Sleet Wheels and Scrapers. They keep your wires free from ice and are made in two sizes, 4-in. and 6-in.

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ARE MADE RIGHT AND STAY RIGHT

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Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

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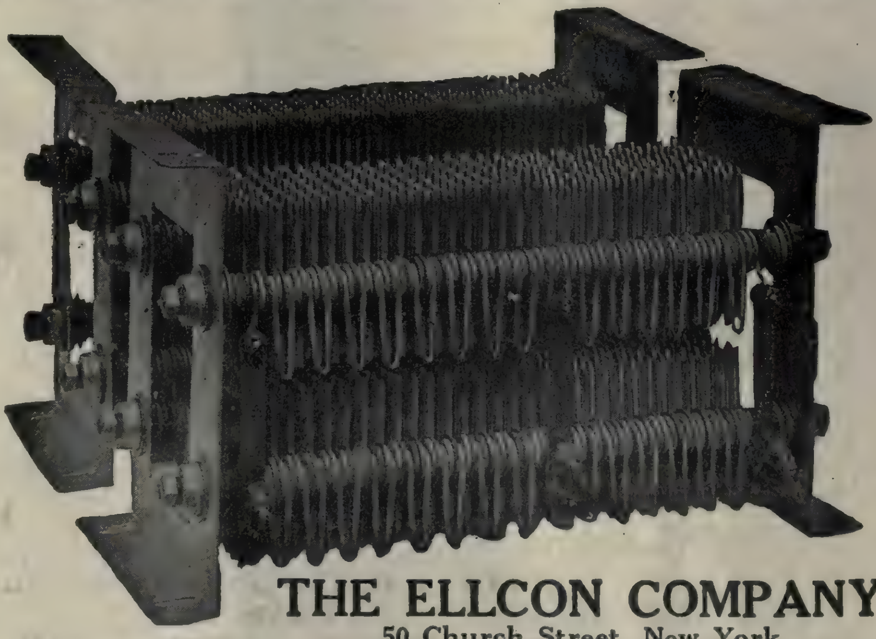

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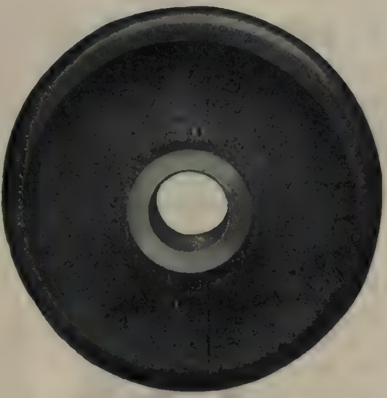

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Third Rail Insulators, Trolley Bases, Poles, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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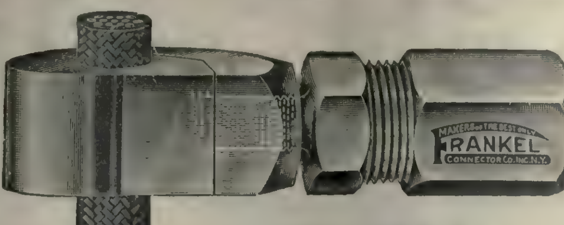

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Solderless
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Approved by underwriters.

Supplied for all sizes of cables and wires.

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For Every
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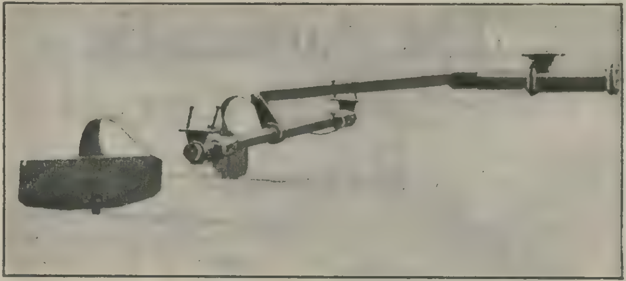

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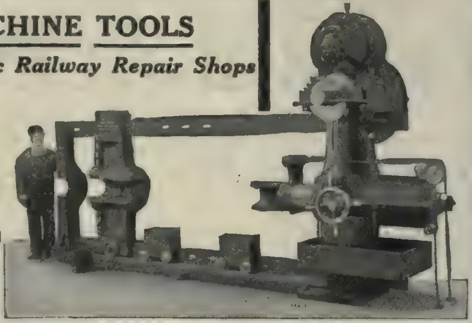

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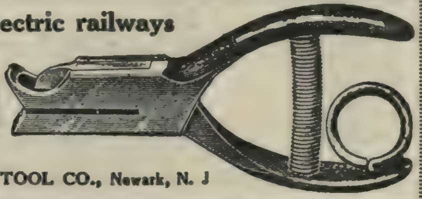

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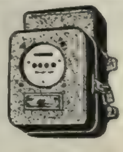
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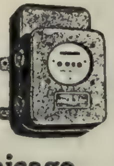
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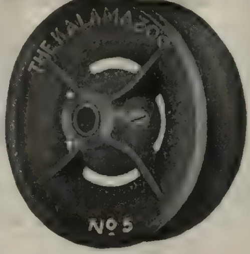

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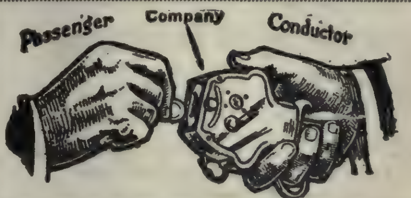

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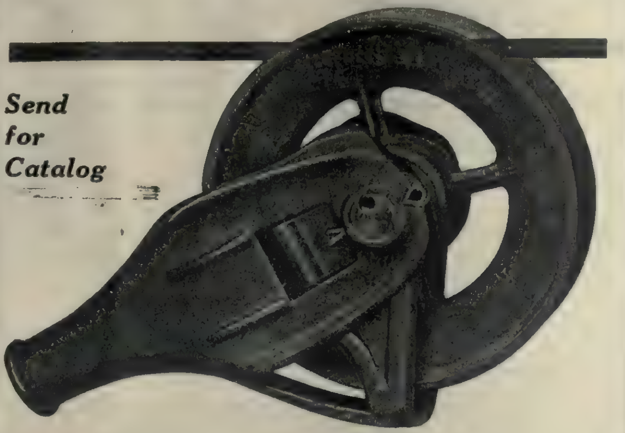

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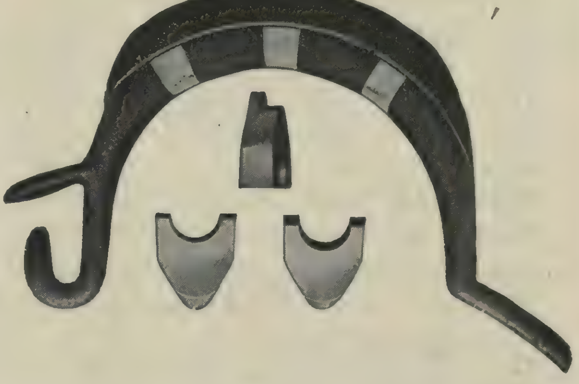

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Desk Room for Rent
Educational
Employment Agencies
Desk Room Wanted
Foreign Business
Positions Vacant
Partner Wanted
Representations Wante
Salesmen Wanted
Patents for Sale
Plants for Sale
Sub-Contracts Wanted
Work Wanted

Miscellaneous for Sale. or Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

1 to 3 in.,	$3.00 an in.	15 to 26 in.,	$2.70 an in.
4 to 7 in.,	2.90 an in.	27 to 49 in.,	2.60 an in.
8 to 14 in.,	2.80 an in.	50 to 99 in.,	2.50 an in

Rates for arger space furnished on request.

For quick and satisfactory results
tell the reader everything that
he wants to know.

INFORMATION

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
1570 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
1100 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	San Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitaties receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

---

85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to lengths for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.

POSITIONS VACANT

BARN foreman, experienced in modern methods of inspection and maintenance of car equipment. Reply in own handwriting, stating age, nationality, experiece and salary expected. P-261, Elec. Ry. Journal, Phila.

GENERAL foreman wanted for shops and car barn at Columbus, Ohio. Must be first-class man, capable of maintaining interurban equipment. Give age, draft classification, education, experience, references, and salary expected. Address reply to F. J Foote, master mechanic, The Ohio Electric Railway Co., Columbus, Ohio.

POSITIONS WANTED

AN able efficient executive in charge of combined railway and light properties since 1910 (gross income $350,000) desires to make a change. PW-264, Elec. Ry. Journal, Philadelphia, Pa.

EXPERIENCED electric lighting and railway auditor and acountant seeks change. At present auditor of manufacturing company, with two years' cost experience. Graduate Administration School and mechanically and electrically educated. Salary, $3600. East preferred. PW-267, Elec. Ry. Journal, Phila.

ENERGETIC, ambitious, 38 years old man, 15 years' experience in street railway transportation with large company. Thoroughly familiar with every detail of the department, including charting traffic, making and adjusting schedules and handling men, desires position as transportation superintendent. My record with present employer is proof of my ability. PW-258, Elec. Ry. Journal, Cleveland.

FOR SALE

10,000 ft. 70-lb. A.S.C.E.

RAIL

850 ft. 56-lb. A.S.C.E., complete with splices. Second-hand, excellent condition.

Immediate shipment.
Address

E. B. SMITH
Purchasing Agent, Monongahela Valley Traction Co.
Fairmont, W. Va.

FIRST Get Bulletin 250—or, Wire

ZELNICKER IN ST. LOUIS

Before buying or selling

RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.
What have you for sale?

POSITIONS WANTED

A STRICTLY high grade young operating executive, now employed, with a broad experience in the management of operation of electric light, power, water, gas, city and interurban railway properties, including operation of extensive transmission systems, in centers of population of sixty-five thousand and less, will consider new connections in charge of operation of the above class properties, either individual, combined or group; or will consider a connection as assistant to an executive handling larger operations. A practical operating man; now employed, desires new connections only to broaden field of work; an oorganizer; a handler of men; long on policy; at home in the management of any phase of operation or construction in connectio with above class of utilities, ad can get results. Married; 33 years of age; can cange connections in thirty days; present salary, forty-eight hundred dollars. Will call for personal interview if proposition appears attractive. PW-260, Elec. Railway Journal, Chicago.

MANAGER or executive engineer on electric railway or group of properties; 25 years' experience in construction and railway operation. Successful in securing coöperation of men. Best of references. PW-266, Elec. Ry. Journal.

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

POSITIONS WANTED

OPERATING and Constructing manager, city and interurban railways, desires new connection. Salary $3600 per year. Carl H. Fuller, Box 1389, Mobile, Ala.

POSITION as general manager of medium size road, twenty years' experience know every detail of operation, construction and maintenance, age 45, married, salary reasonable. PW-262, Elec. Ry. Journal, Phila.

POSITION wanted as master mechanic with interurban property; have had 12 years' experience with both 600 and 1200 volt high-speed equipment. Can furnish best of references from past and present employers. PW-268, Elec. Ry. Journal, Cleveland.

ANoperating executive with broad experience in operation and contruction of electric and steam railways, some experience in power and lighting. Now employed as general manager and chief engineer of railway in middle west; will consider new connections to broader field. Previously connected with properties in cities of two hundred thousand and more. Have record for rehabilitating, refinancing, public policy, franchise matters and earning the net revenue. Organizer, can handle men; also combined operation, traffic and engineering. Present connection has heavy freight business. Well posted on freight divisions, etc.; broad acquaintance. Present salary $3600 per year plus 10% of net revenue. Want to connect with property where honest, efficient, energetic efforts are desired and appreciated. Will go any place and will call for personal interview. Am 40 years of age and married. PW-269, Elec. Ry. Journal, Chicago.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Acetylene Service and Apparatus
Oxweld Acetylene Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Anchors, Guy
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co
Westinghouse Elec. & M. Co.

Automobiles and Buses
Brill Co., The J. G.

Axle Straighteners
Columbia W. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices
Columbia M. W. & I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.
Nichols-Lintern Co.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Holden & White, Inc.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Boilers
Babcock & Wilcox Co.

Boiler Cleaning Compounds
Johns-Manville Co., H. W.

Boiler Coverings
Johns-Manville Co., H. W.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.
Oxweld Acetylene Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Trac. B. Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W., The
Zelnicker, Walter A., Supply Co., Inc.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
United States Graphite Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Cables. (See Wires and Cables.)

Calculating Machines
Monroe Calculating Machine Co.

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment, (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Cars, Section
Mudge & Co.

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Circuit Breakers
General Electric Co.
Automatic Reclosing Circuit Breaker Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling—(See Conveying and Hoisting Machinery.)

Coal Crushers and Pulverizers
Williams Patent Crusher & Pulverizer Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
General Electric Co.
Westinghouse Trac. B. Co.

Condensers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conduits, Underground
Johns-Manville Co., H. W.

Connectors, Solderless
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Electric Service Supplies Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.
Green Engrg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Creosoting. (See Wood Preserva tives)

Cross Arms. (See Brackets)

Crossing Signals. (See Signals Crossing)

Crossings, Track. (See Track Special Work)

Culverts
American Rolling Mill Co.
Bark River Bridge & Culvert Co
California Cor. Culvert Co.
Canada Ingot Iron Co., Ltd.
Canton Culvert Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Cor. Cul. Co.
Iowa Pure Iron Co.
Kentucky Culvert Mfg. Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Maryland Cul. & Metal Co.
Michigan Bridge & Pipe Co.
Montana Culvert & Flume Co.
Nebraska Culvert & Mfg. Co.
New England Metal Cul. Co.
Northeast Metal Culvert Co.
Northwestern Sheet & I. Wks.
O'Neall Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal Cul. Co.
Spokane Cul. & Tank Co.
Tennessee Metal Culvert Co.
U. S. Bridge & Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal Mfg. Co., Inc.
Western Metal Mfg. Co.
Wyatt Metal & Boiler Works.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Imperial Brass Mfg. Co.
Oxweld Acetylene Co.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co.

BUY
War Savings
Stamps

Weston

Electrical Indicating Instruments

are unqualifiedly superior to any other instruments designed for the same service.

A.C. or D.C., Switchboard or Portable Instruments for every field of Indicating Electrical Measurement. In writing for catalogs and bulletins please specify the field that interests you.

Weston Electrical Instrument Co.
21 Weston Ave., Newark, N. J.
23 Branch Offices in the Larger Cities

WHAT AND WHERE TO BUY

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward.

Doors, Asbestos
Johns-Manville Co., H. W.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A. Inc.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting & Operating
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., H. M.
Ford, Bacon & Davis.
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter.
Scofield Engineering Co
Stone & Webster.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

Engines, Gas and Oil
Westinghouse Elec. & Mfg. Co.

Engines, Steam
Westinghouse Elec. & Mfg. Co.

Fare Boxes
Brill Co., The J. G.
International Register Co., The
Johnson Fare Box Co.
National Railway Appliance Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.
Page Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Electric Service Supplies Co.
Root Spring Scraper Co.
Star Brass Works.

Fibre and Fibre Tubing
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Johns-Manville Co., H. W.

Fire-Proofing Material
Johns-Manville Co., H. W.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

Forgings
Eureka Co.
Standard Steel Works Co.

Frogs, Track. (See Track Work)

Furnaces. (See Stokers)

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gages, Oil and Water
Ohio Brass Co.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Railway Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bell and Gongs)

Graphite
Morgan Crucible Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
Holland Trolley Supply Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists and Lifts
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic and Fire
Johns-Manville Co., H. W.
Westinghouse Traction Brake Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

Inspection
Electrical Testing Lab's.

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Pape and Tape
General Electric Co.
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insurance, Fire
Marsh & McLennan

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

Joints, Rail
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Junction Boxes
Johns-Manville Co., H. W.

Laboratory
Electrical Testing Lab's.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lighting Regulators, Car
Holden & White, Inc.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers
Galena-Signal Oil Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, etc.)

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Mats
Johns-Manville Co., H. W.

Meters, Car, Watt-Hour
Economy Electric Devices Co.

Meters. (See Instruments)
Electric Service Supplies Co.
Wood Co., Chas. N.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Motors, Electric
Westinghouse Elec. & M. Co.

Motor Generation, Bonding and Welding
Lincoln Bonding Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Oils. (See Lubricants)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)

Packing
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Packing Rings
Johns-Manville Co., H. W.

Paints and Varnishes. (Insulating)
Mitchell-Rand Mfg. Co.

Paints and Varnishes. (Preservative)
Johns-Manville Co., H. W.

Paints and Varnishes for Woodwork
National Ry. Appliance Co

Paving Material
Am. Brake Shoe & Fdy. Co.
Barrett Co., The

Paving Pitch
Barrett Co., The

Pickups, Trolley Wire
Electric Service Supplies Co.
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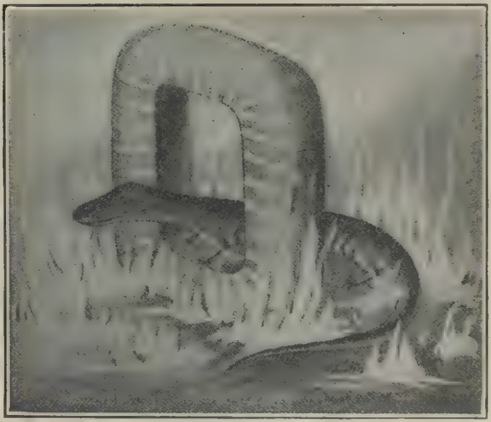

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Trolley Wheels. (See Wheels, Trolley)

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General Electric Co.
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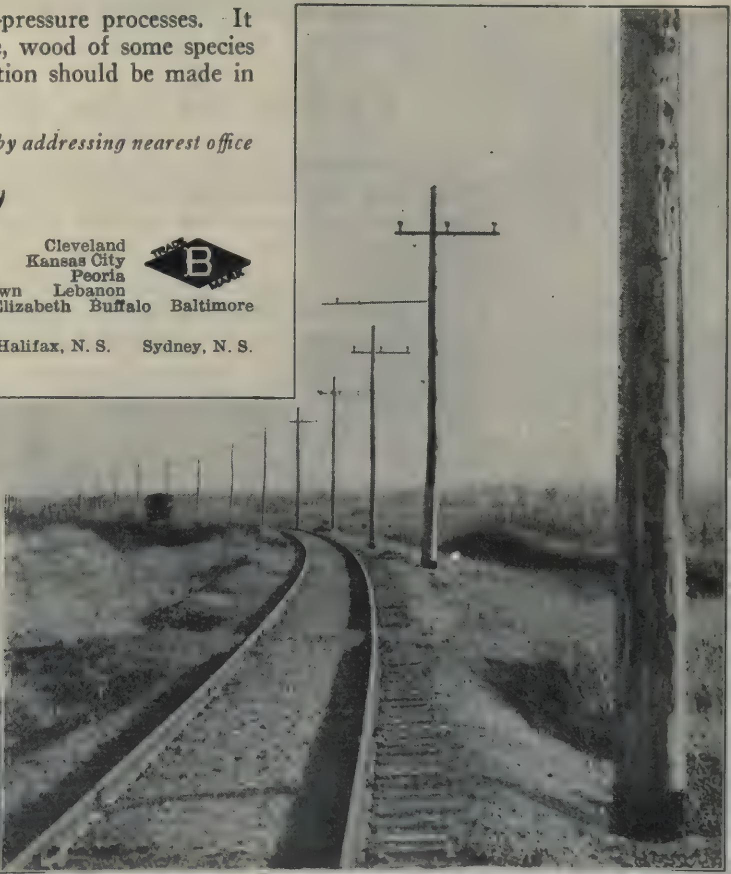
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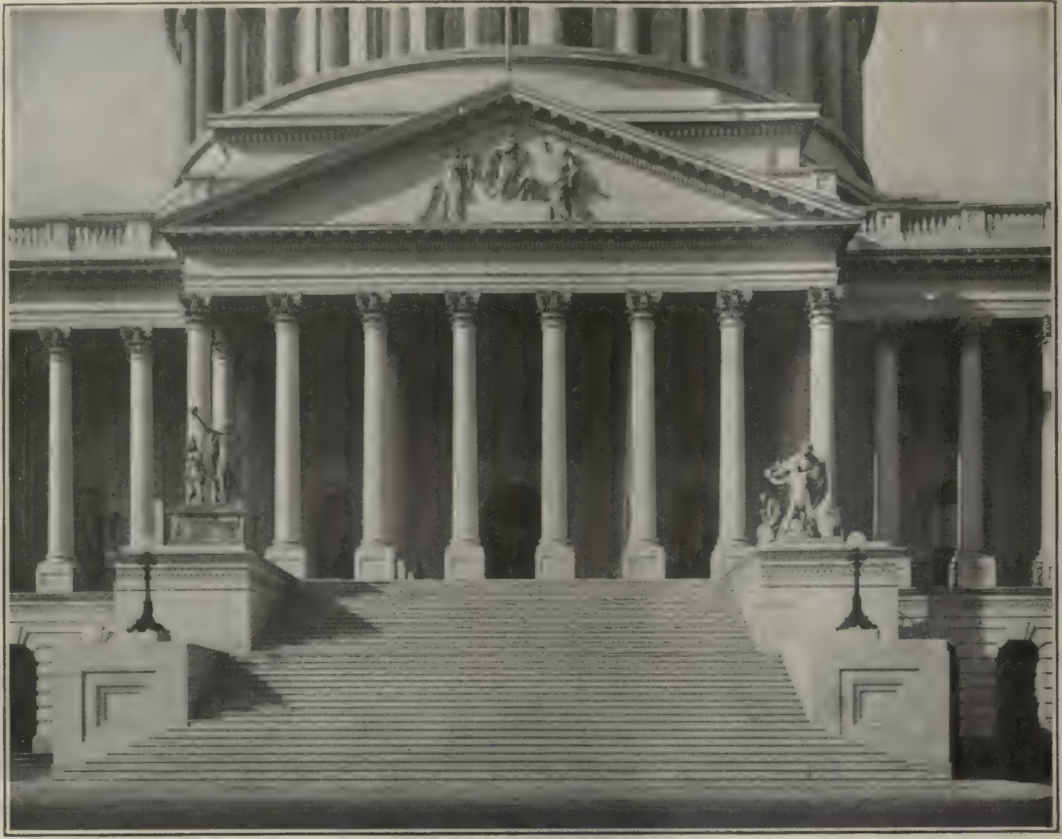

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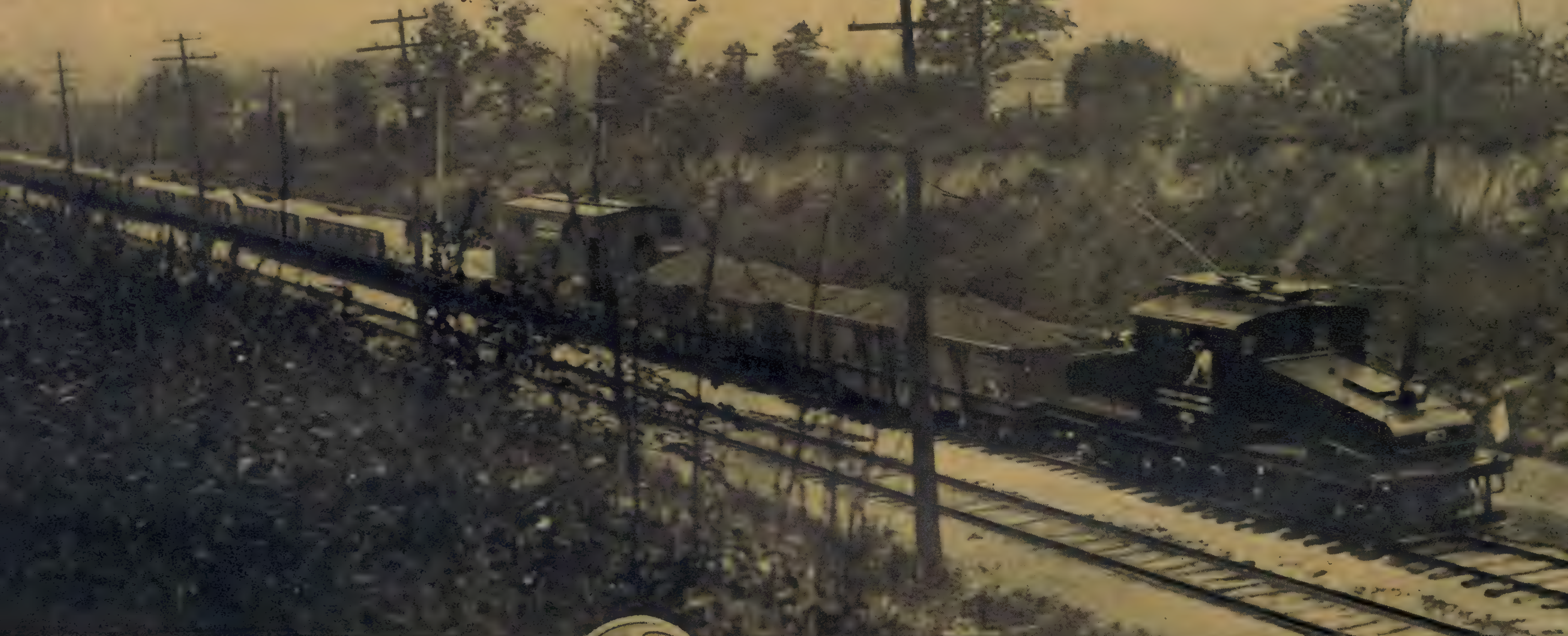

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